The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Capital Investments in British Shipping.

Many attempts have been made to estimate the amount of British capital invested in shipping. The most recent, and probably a reliable one, is published by the *Economist*. Lloyd's Register of Shipping, issued in July last, shows a total of 14,685 ships, having a tonnage of 10,497,766 tons. Valuing the steamers at about $90 per ton and the sailing ships at $60, the aggregate value of this shipping is $800,000,000. But the additional entries of a further year will bring the total up to $850,000,000. There are, however, other centers of registration besides Lloyd's, such as the "Liverpool Register," the "French Veritas" and the "American Record"—each of which has the names of English-owned vessels in it. The *Economist* thinks that the total value of purely British ships is not less than $1,000,000,000—and, still further, if the Canadian, Australian, New Zealand, India and China steamers belonging to the English be added, the amount must reach at least $1,250,000,000. There are also new vessels building on behalf of British owners to the value of $100,000,000. If we assume that the average return to the shareholders on this large investment of capital is 6 per cent., it appears that the revenue coming to these islands from the shipping industry is not less than $75,000,000 per annum. This amount is much more widely distributed than most people would be disposed to imagine, large numbers of persons being interested in shipping, though not actively, through the systems of private partnership and limited liability.

The Werder Testing Machine.

In a recent issue of *Engineering*, London, we find a full description of a 100-ton Werder testing machine, and think that its reproduction in our columns will meet with the favor of a large number of our readers. The machine is one of a type which is well known on the European Continent, and its design embodies numerous interesting and novel features. The type is one originally designed in 1852 by Herr Ludwig Werder, director of the engineering works of Klett & Co., of Nürnberg, now the Maschinenbau-Actien-Gesellschaft, Nürnberg. It was exhibited at the Munich Exhibition in 1854, where experiments conducted upon it attracted great attention, and where it obtained a gold medal. Since that time a considerable number of similar machines have been constructed; there is one at Creusôt, one at Stockholm, and one in Spandau, while the Polytechnic Schools at Zurich (Professor Culmann), Munich (Professor Bauschinger), Vienna (Professor Jenny), Pesth (Professor Horvath), the Gewerbe-Academie in Berlin, and the Engineering Institute in St. Petersburg, each have one for use in an engineering or mechanical laboratory.

The particular machine which is here illustrated was one exhibited by the Maschinenbau-Actien-Gesellschaft, Nürnberg, the makers, at the recent exhibition in that city, where it was under the charge of Professor Bauschinger, of Munich, who conducted a series of most interesting experiments upon it with the aid of the various strain measuring instruments which he has designed.

The Werder testing machine is one of those in which the load is applied by hydraulic pressure, but measured by dead-weight, as in Mr. Kirkaldy's machine. But in the Werder machine the ram, lever and weights are all at the same end of the machine, while by an ingenious arrangement one lever only is required, instead of two, or perhaps three, for a leverage of 500 to 1. Figs. 1, 2, 3, 6, 7, 8 and 9 show the principal parts of the machine. Fig. 1 is a general side elevation of the machine and Fig. 2 a plan. Fig. 7 is a cross-section to the right and Fig. 8 to the left of the pump ram. Fig. 3 is a sectional elevation showing the principal knife edges. Fig. 6 is a sectional view showing the side knife edges.

The hydraulic cylinder A of the machine is cast in one piece with the frame B. The ram C (Fig. 3), which is 11.8 inches in diameter, is covered with brass. The pressure is obtained by two pumps placed beside the machine in the casing D. The smaller, 0.4 inch in diameter, is used for the full power of the machine, the larger, 1.18 inches in diameter, being available only up to 20 tons. These pumps can be worked either by gearing or by the hand-levers E_1 and E_2. They are placed above a small reservoir, F, and deliver into the ram cylinder by the bent pipe G. J is a release-valve for the pump and H an air-valve on the top of the cylinder A, which is left open when pumping begins, in order that the cylinder may be free from air. On the front end of the ram G is fixed a somewhat complex cross-head (Figs. 3 and 7), carrying two brackets, N_1 and N_2, and a frame, K K, this latter extending forward in a V shape (Fig. 2) and backward on each side of the cylinder, where it is carried on Λ-shaped guides, L L (Figs. 3 and 8). The brackets N_1 N_1 carry a cross spindle or traverse, O, which, therefore, moves always outward or inward with the ram. The front end or vertex of the frame K carries the little train of gearing M (consisting of a hand-wheel with worm and worm-wheel and a pinion on the same spindle as the latter gearing with a fixed rack), by means of which the ram can be worked in and out by hand when no load is on it. By a simple arrangement, the rack is thrown out of gear when the machine is at work, to avoid the chance of breaking the teeth when the test-piece gives way.

So far we have described merely the connection between the hydraulic ram and the frame of the machine; we have now to look at the connection between the ram and the steelyard or load-measuring apparatus, which in the Werder machine forms the connecting link between the ram and the test-piece, instead of being, as in the Kirkaldy and most other types of machine, attached to the opposite end of the test-piece. The piece to be broken is pulled from the main crosshead V, which, by means of the four pull-rods T_1 to T_4, forms one piece with a pair of crossheads U_1 U_2 (Figs. 1, 2, 3 and 6). The whole of this system of rods and crossheads hangs freely from the ram crossheads, its weight being taken at the one end by the rings W_1 W_2 on the traverse O, and at the other end by the rings X_1 X_2 hanging from pins upon the frame K. On the faces of the crossheads U_1 U_2 are steel blocks d_1 d_2 (Figs. 2 and 6) through which the pull of the piece is transmitted to corresponding knife edges c_1 and c_2 forming part of a large block Q Q, to which the lever Q_1 (Fig. 3) is rigidly attached. This block hangs freely from the traverse by the knife-edge links P_1 P_2, its balance being adjusted by the sliding weight S (Figs. 2 and 6). It is roughly ⊃ shaped, the two limbs extending on the sides of the ram cylinder, and has two openings through it for the crossheads U_1 and U_2. In its middle breadth it is fitted with a knife edge *b* (Figs. 1, 2 and 3), which bears against a steel face, *a*, forming part of the ram crosshead. The knife-edge *b* is 14.2 inches wide, and the two knife-edges c_1 and c_2 together 15 inches wide, so that the pressure upon them is about nine tons per linear inch at the full load (100 tons) of the machine. The block Q has thus five knife edges attached to it. Of these five, four are in one line—viz., the two which carry the weight of Q and rest in the links P_1 P_2, and the two c_1 and c_2 which transmit the pressure to the crosshead U_1 U_2. The fifth knife edge *b* is 3 mm. (0.12 inch) lower than the line of the others. The radius of the scale-pan R being 1.50 meters from the plane of the knife edges, it will be seen that the block Q is really a bell-crank lever, whose arms have lengths in the ratio of 500 to 1; the fulcrum abuts on the head of the ram, the long arm carries the scale-pan, and the short arm pulls against the test-piece through the rods T. Fig. 10 illustrates the principle of this arrangement. The distance F G in this sketch, the short arm of the lever, being only 3 mm., is in reality too small to be shown in our drawings.

When load is applied to the test-piece the ram moves out, of course, as much as the piece stretches, or as the fastenings "give." But the ram, as we have seen, carries with it the whole of the weighing arrangements, and as long as the block Q can be kept horizontal—which is easily done with the help of

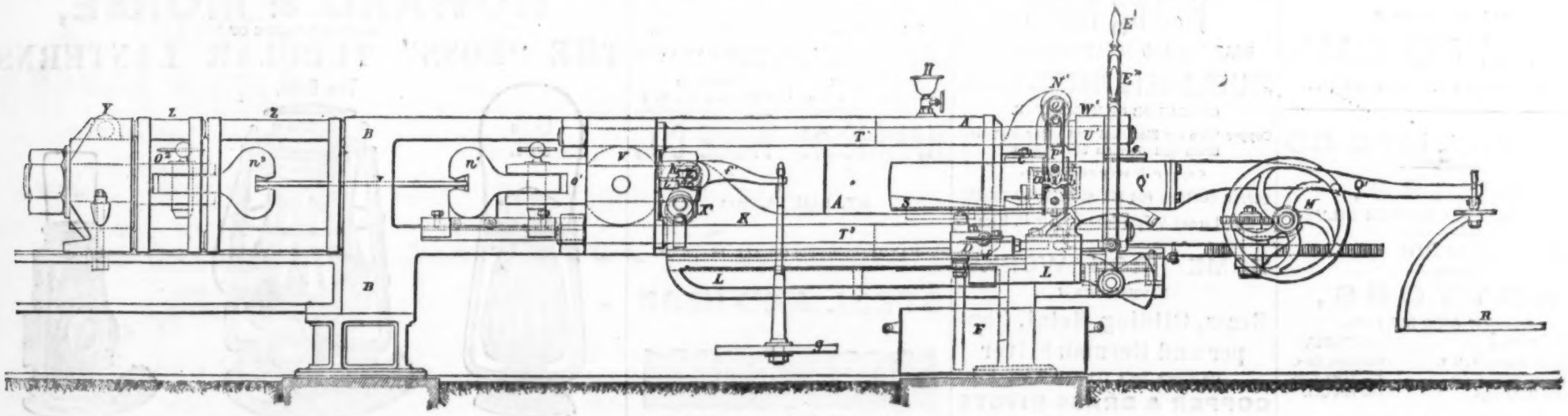

Fig. 1.—Side Elevation of the Machine.

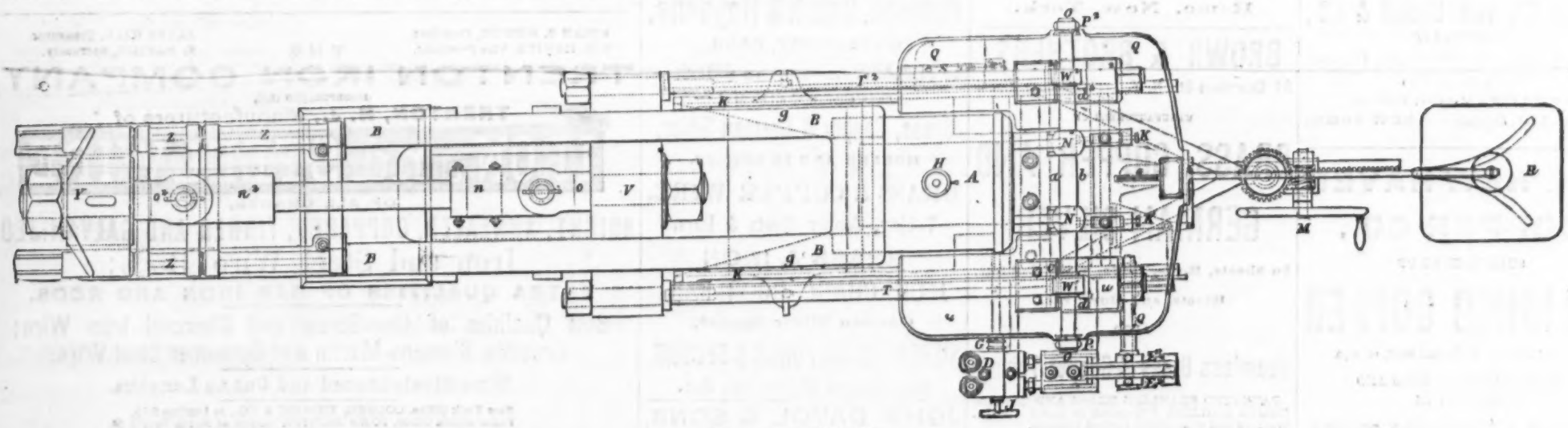

Fig. 2.—General Top View.

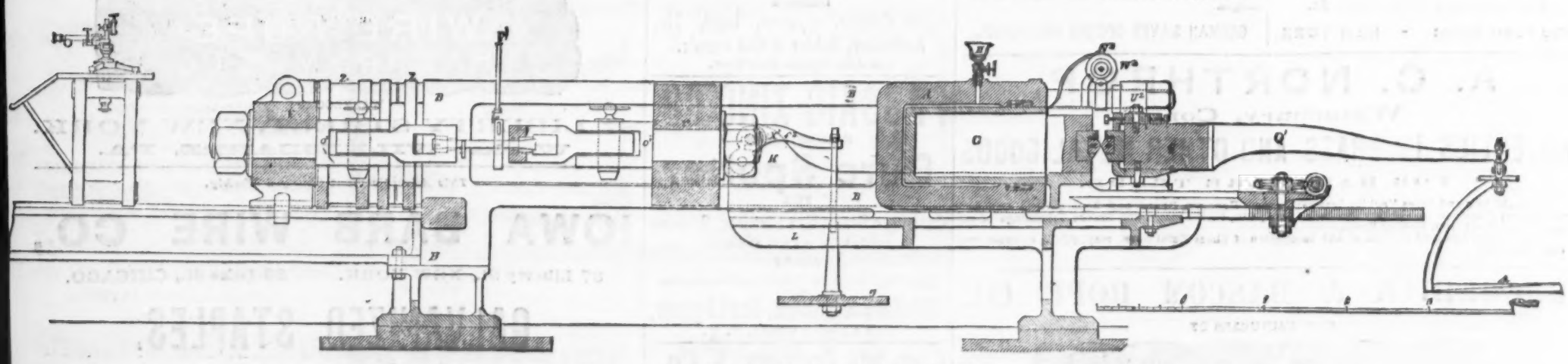

Fig. 3.—Sectional Elevation, Showing Principal Knife Edges.

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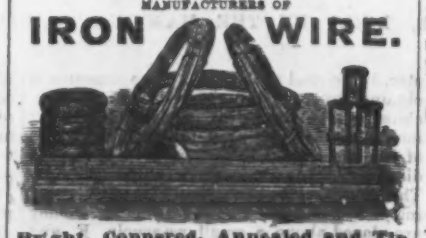

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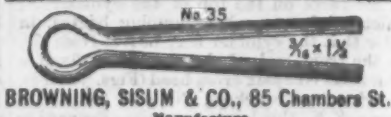

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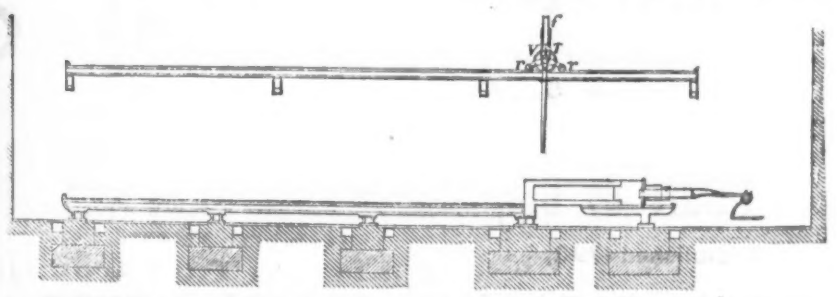
a delicate level—the actual pull on the piece is equal to the pressure of b against a, and this is found by multiplying the weights placed on the scale-pan R by 500. There is no sliding or monkey weight; the weights have to be put separately on the scale-pan, but, of course, the very large leverage reduces, to some extent, the inconvenience of this arrangement.



One-Hundred-Ton Werder Testing Machine.—Fig. 4.—General Arrangement of Machine in Laboratory.

It is obvious that there is no possibility of directly checking, with sufficient accuracy, the length of the short arm lever (3 mm.), upon which the whole accuracy of the machine depends. For the purpose of checking the leverage, therefore, a "controlling" arrangement is fitted up, which is shown in the drawings in detail. This gear consists of a pair of knee levers f_1 f_2 (one on each side of the machine) having fulcra at k k on the frame K. From the long arms (530 mm.) hangs a scale-pan, g, the short arms (35 mm.) abut at i l against the crosshead V. The knife edges on this lever, its arm being only 19 : 1, can be measured sufficiently accurate by ordinary means, and then, to test the accuracy of the 500 : 1 ratio, it is only necessary to balance any weight in g by one-fiftieth as great a weight at R. In the practical working of the machine this is done periodically, and means are provided for altering the position of the main knife edges by screws, should they be found in any way out of truth.

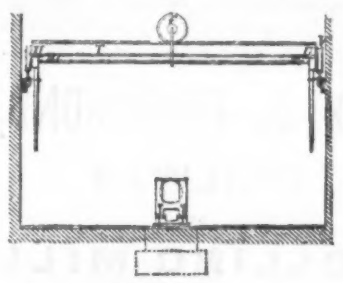


Fig. 5.—End View of Fig. 4.

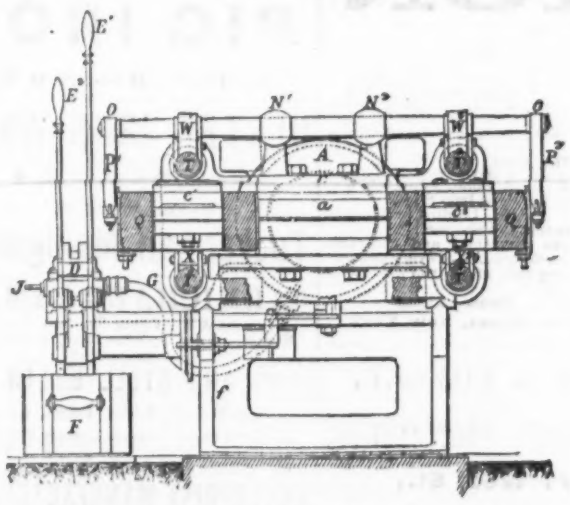


Fig. 7.—Cross Section to the Right of Pump Ram.

Figs. 1, 2 and 3 show the machine arranged for tension; the arrangements do not call for any special remark. Z Z are packing pieces with planed bearing faces, which are put in to make up the length necessary for the piece. Y is the crosshead which takes the pulley; its recoil is prevented by bolting it down.

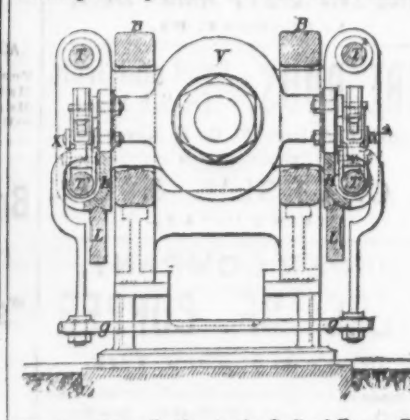


Fig. 8.—Cross Section to the Left of Pump Ram.

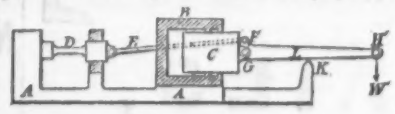


Fig. 10.—Arrangement of Levers.

Figs. 4 and 5 show, to a small scale, the general arrangement of the machine in the laboratory, and the overhead crane used for handling materials, &c.

At Salez, in the Swiss canton of St. Gallen, some 60 bronze hatchets have been dug up from a depth of about a yard beneath the surface of the ground. The implements are believed to be at least 2500 years old.

Vital Statistics in Large Cities.

Efforts have been made by the Board of Health for several years to collect information about the mortality, increase in population and sanitary conditions of foreign and American cities, in order that the health regulations of the city may be improved. Hundreds of reports are sent from the Bureau of Vital Statistics every year to the health authorities of cities throughout this country and Europe, with the request that like information shall be returned. Responses come from European cities promptly, as a rule, while in this country the reports from the sanitary officials often are delayed several months and are imperfect then. The sanitary regulations in America are not so strict as are those of most foreign cities. In several States of the Union the registry of births and deaths is not compulsory, and the health officials do not have opportunities for collecting information. Reports of vital statistics for the year 1882 were received from all the large cities in Europe by Dr. John T. Nagle, the Deputy Register in the Health Department, three months ago, while Chicago, Philadelphia and many other cities of the United States have not yet been heard from. Persons who think that the cities and large towns in America are healthier than those on the other side of the Atlantic would be undeceived by reading the reports for last year now in the possession of the Board of Health. New Yorkers, in particular, might be shocked to learn that the death-rate was greater in the American metropolis last year than that of any of the great capitals in Europe. For the purpose of comparison, the following statistics of population, births and deaths in six foreign and six American cities were taken from the reports:

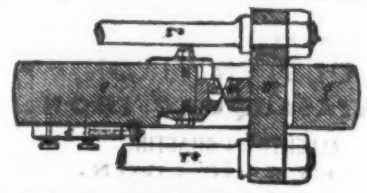


Fig. 6.—Sectional View, Showing the Side Knife Edges.

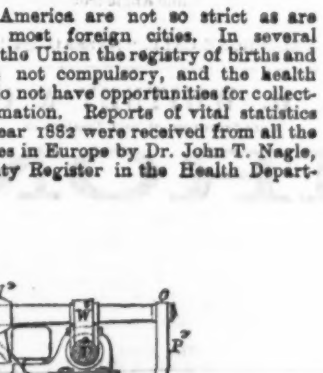


Fig. 9.—End View of Fig. 3.

	Population at last census.	Births, 1882.	Deaths, 1882.	Death-rate per 1000 inhabitants, 1882.
Foreign cities.				
London	3,816,483	133,200	82,905	21.72
Paris	2,239,928	62,587	58,702	26.27
Berlin	1,174,233	44,466	30,465	25.94
Vienna	726,105	29,872	21,595	29.16
Glasgow	537,200	19,792	12,985	24.44
Dublin	346,693	10,073	9,679	27.85
American cities.				
New York	1,206,577	* 27,321	37,924	29.64
Brooklyn	566,689	* 10,656	15,073	24.84
Baltimore	408,520	7,759	8,923	21.84
Boston	362,839	10,986	9,015	23.42
Cincinnati	255,708	7,102	6,873	24.55
San Francisco	234,000	8,115	5,449	21.68

* Incomplete.

There are two reasons why the number of deaths reported in New York and Brooklyn is in excess of the number of reported births. Many physicians are negligent in reporting

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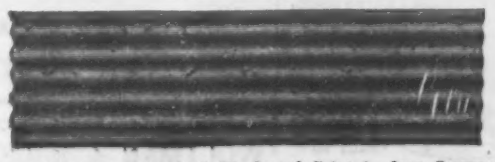

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cases of birth which they attend, although the sanitary regulations require such reports to be made. The death-reports in each city are complete, because bodies cannot be removed for burial without permits from the health authorities. The constant tide of emigration to this part from foreign cities also tends to make the deaths outnumber the births in any year in New York and neighboring cities. The effectiveness of sanitary regulations is shown better by the proportion which the general mortality bears to the infant mortality in a place. It is to the credit of Paris that of 58,702 persons who died in 1882 only 17,411—less than one-third—were under five years of age, while 17,266 children of that age died in Berlin and 36,259 in London in the same year. The deaths of children under five years in the American cities named, in 1882, was as follows: New York, 17,520; Brooklyn, 7136; Baltimore, 3755; Boston, 3172; Cincinnati, 2904; San Francisco, 1670. One of the healthiest cities in Europe is Geneva, in Switzerland, which had a population of 50,559 at the last census. There were 1061 births there last year and 818 deaths, the death rate per 1000 inhabitants being only 16.18. It may be surprising to some persons that Troy, N. Y., had a better record than Geneva. The population of Troy is about 55,000. Within the limits of the city last year, 1025 children were born, 745 persons died and the death rate was only 12.62. The lowest death-rate yet noted for last year was 4.07, at Council Bluffs, Iowa, where, with 18,509 inhabitants, the births numbered 252 and the deaths only 92.

The death-rate of a city usually bears a close relation to the prevalence of pulmonary complaints and contagious diseases. Below is a comparison of deaths from consumption and from the most prevalent forms of contagious disease in the 12 cities in 1882:

Cities.	Phthisis pulmonalis.	Scarlet fever.	Diphtheria.	Measles.	Small-pox.
London	8,405	2,004	863	2,329	431
Paris	11,011	158	2,390	1,018	661
Berlin	3,791	604	1,914	144	5
Vienna	5,804	410	332	202	808
Glasgow	2,192	263	177	203	.....
Dublin	1,182	37	31	567	.....
New York	5,251	2,066	1,523	913	259
Brooklyn	1,806	892	631	168	12
Baltimore	1,217	170	707	71	551
Boston	1,560	60	468	14	9
Cincinnati	783	336	118	68	1,249
San Francisco	803	58	128	60	20

Dr. E. H. Janes, the Assistant Sanitary Superintendent, when asked why the death-rate of New York was so large, in comparison with that of any other large city, gave the following explanation: "A great many persons who are not residents of the city die here every year. New York is a great commercial center, and there is a constant floating population not accounted for in the census returns. Persons who come here intending to stay only a few days for business purposes sometimes die in private houses or at the hotels. Every year there is an army of tramps in the city, and many of the vagrants die from exposure or the effects of dissipation. Most of the emigrants who come to this country stay in New York for longer or shorter periods, and deaths among them are frequent. From many parts of this State, and from other States, persons come to New York to be treated for chronic or incurable diseases or to have operations performed. All the deaths at hospitals and institutions on Blackwell's, Ward's, Randall's and Hart's Islands are credited to the city. Large numbers of business men in the city live in Brooklyn, Jersey City and other places near the city; yet some of them die here suddenly, or are seized with fatal illness which prevents them from going to their homes. New York is not an unhealthy city, and I feel sure that the actual death-rate is much lower than the one which is based on the last census. The population of the city is much greater than the census returns indicate. The census of the city ought to be taken in the winter time, and the returns of the Italian quarters and lodging houses ought to be collected at night."

The British Empire.

A Canadian exchange of a late date has the following:

Recent dispatches state that the Australians are taking steps to urge upon the home authorities the wisdom, if not the actual necessity, of annexing the New Hebrides, the Solomon and other groups of islands in the Southern Pacific Ocean. Should this idea be carried out, the acquisition will add considerably to the territory and population of the British Empire, and open up for the purposes of trade and civilization portions of the world that are said to be richly endowed by nature, and which have too long been neglected. The New Hebrides cover about 3500 square miles, and have a population of about 200,000 souls, according to the estimate of persons who have visited the islands. The inhabitants are said to be fierce, dirty, and of a low type intellectually. The Solomon Islands contain about 10,000 square miles, with an estimated population of 500,000, chiefly Malays and Papuans. As to the other groups referred to, we are not able to give any particulars, as they are not named. With the recent and proposed additions, we find that the British Empire is made up as follows, according to the latest statistics:

Country.	Square Miles.	Population.
Great Britain and Ireland	121,115	36,100,000
Indian Possessions	1,558,254	254,000,000
Other Eastern Possessions	30,000	3,850,000
Australasia	3,173,319	3,000,000
North America	3,620,500	4,500,000
Guiana, &c	100,000	200,000
Africa	270,000	2,250,000
West Indies	12,707	1,300,000
European Possessions	120	175,000
Various settlements	9,171	20,000
New Guinea	300,000	2,000,000
Bechuana Land	100,000	200,000
New Hebrides	3,500	200,000
Solomon Islands	10,000	500,000
Totals	9,327,677	346,375,000

This table, as a recent writer has said in referring to the vast extent of the British possessions, "presents a result unparalleled in the world's history. The British Empire is grander than those of Rome and Greece, or any others that have ever existed." The figures are simply marvelous when one studies them. The three Kingdoms that form the

heart and center of the whole embrace within their boundaries but 121,115 square miles, a farm, so to speak, as compared with the 9,395,677 square miles that the entire Empire covers. The population of the mother countries is but 36,100,000; yet the Queen of Great Britain is the recognized monarch, ruler and head of over 310,000,000 of subjects, or about one-fourth of the entire estimated population of the world. If we count in the great Republic to the south of us—which is practically British in its language, laws and customs—we add largely to the figures we have given. There is no race of mankind, hardly a tribe on the face of the earth, that has not its representatives living under the British flag. Almost every form of religion—Jew and Gentile, Protestant and Catholic, Buddhist and Mahommedan, infidel and heathen—has its adherents or followers on British territory. While she has her own code of laws, she at the same time administers the laws of other nations, down even to tribal forms and customs. The languages and dialects spoken on her soil are counted by the hundred, and, of the hundreds of millions of people beneath her sway, every man has a right to go to the throne itself for justice and protection. It has well been said that, whether we call Great Britain an empire or a limited monarchy, "with all its anomalies and apparently opposing systems, it presents the nearest approach to a true commonwealth that has yet been seen." If "in the brave days of old" it was a protection to a man to be able to say "I am a Roman citizen," what a shield and passport the world over it is in these latter times to be able to make the proud declaration, "I am a British subject."

Th aporative Power of Bituminous Coals.*

BY WILLIAM KENT, M. E.

The report made to the Navy Department in 1844, by Prof. Walker R. Johnson, of "Experiments on the Evaporative Power and other Properties of American Coals," has long been accepted as a standard work of reference, not so much on account of the real value of the information it contains, as on account of the fact that during the nearly 40 years that have elapsed since its publication no work on the subject of which it treats has appeared to supplant it. In many respects it is an admirable report, giving a faithful record of carefully conducted experiments, and including the proximate chemical analysis as well as the apparent evaporative power of the coals tested. It has, however, two very serious defects; it does not treat at all of any American coals mined west of Pittsburgh, and it does not give the real evaporative powers of such of the bituminous coals as were tested, but only their apparent evaporative powers as shown under conditions unfavorable to the development of the best results.

A pamphlet has recently been published by the Quartermaster General of the U. S. Army, Gen. M. C. Meigs, entitled "Report on Fuel for the Army," which contains the results of 106 experiments with various coals, 75 with a vertical water-tube boiler known as the Little Giant, rated at 5 horse-power, and 31 with a vertical water tube boiler of about the same capacity, designed by General Meigs. Of the experiments with the Little Giant boiler, 25 were made with Pennsylvania anthracite, and 50 with semi-bituminous, bituminous, lignite and cannel coals; with the other boiler 6 experiments were made with Pennsylvania anthracites and 25 with semi-bituminous, bituminous, lignite and cannel coals. A very much large number of coals were tested than in Johnson's experiments, and they included coals from nearly every section of the United States, and also some foreign coals. In the letter transmitting the report to the Secretary of War, General Meigs states that the object of the experiments was a careful determination of the *actual value as fuel* of the various kinds of fuel purchased and issued for the use of the army.

These numerous experiments having been conducted at Government expense, with all the facilities which the War Department is capable of affording, by Mr. L. M. Luncker, "a mechanical engineer, educated at the Polytechnic School, Carlsruhe, Germany," in the light of the American experiments of 40 years ago, and of various experiments in foreign countries in more recent times, it might be expected that this report would be an exceedingly valuable one, and that we would find in it either the actual value as fuel of the various coals of the United States, or at least their relative value as a fuel for producing steam. As a matter of fact, however, the report is a disappointing one, and not at all valuable nor creditable to the department which issued it. It contains no analysis of the coals nor any measure of their heating power. The various coals are used by the army as fuel, probably more for heating purposes than for raising steam, yet the report assumes that the heating power of a coal is the same, relatively, as its power of raising steam "in a good steam boiler." If the report did contain even accurate determinations of the steaming power of the various coals, without any attempt at determining their heating power when burned in a heating furnace, or stove or grate, it would still be valuable, and would take the place of Johnson's report; but instead it has all the errors of Johnson in determining the relative steaming values of the bituminous coals intensified. All that the report does contain is simply a statement of what evaporative results were obtained from small quantities (145 to 1200 pounds) of various coals burned at approximately uniform rates of combustion, in a pair of boilers which were entirely unsuitable to the development of even the correct relative steaming power of nearly all the bituminous coals, especially those mined west of the Allegheny Mountains, and containing 30 per cent. or more of volatile matter. General Meigs himself recognizes that the results he obtained are inferior to Johnson's. "In order," he says, "to bring its (the Little Giant boilers) inferior results to the same scale as Johnson's, which are assumed as exact, it has been necessary to use a coefficient by which the results of the trials by the Little Giant boiler are corrected, in order to make them comparable with Johnson's." He says, further: "The boiler used in Johnson's experiments on the evaporative power of coal was expressly constructed for that purpose. It was more economical, more efficient. The coefficient to make Quartermaster-General's office results comparable with Johnson's is 0.843, and dividing Quartermaster-General's office results by this fraction, we have figures comparable with Johnson's." The report does not state how this coefficient was arrived at. It may have been obtained by averaging results, and is approximately correct for anthracite coals and for the free-burning semi-bituminous coals of Maryland, but for Pittsburgh coals the results obtained with the Little Giant boiler, even after dividing by the coefficient, are more than 10 per cent. lower than Johnson's; with Newcastle (English coal), 30 per cent. lower, and with Scotch coal, which happens to be the lowest in Johnson's whole list, over 11 per cent. lower.

The results obtained by General Meigs may be thus briefly summarized: With the Little Giant boiler, with 25 anthracite coals, the number of pounds of water evaporated from and at 212° per pound of coal varied from 8.68 down to 7.59 pounds, and after being divided by the coefficient 0.843, from 10.29 down to 9 pounds. With the same boiler, with 49 bituminous coals, after being divided by the coefficient, only two—a Somerset County, Pa., and a Cumberland, Md., coal—showed an evaporation of over 9 pounds, viz., 10 and 9.96 pounds. The third, a Colorado; fourth, a West Virginia, and fifth, a Colorado, showed respectively 8.59, 8.34 and 8.04 pounds. The sixth, a Pittsburgh coal, shows 7.84; the next five coals—one Pittsburgh, one Indiana, one New South Wales, one Indian Territory and one Vancouver's Island, show over 7 pounds. Then come 18 coals—including one from Pittsburg; two from near Youngstown, Ohio; two Scotch and one English coals, between 6 and 7 pounds; ten coals between 5 and 6 pounds; eight between 4 and 5 pounds; and one, a Utah coal, only 3.79 pounds. Thus, 47 out of 49 bituminous coals, taken from nearly all parts of the world, give poorer results than the poorest obtained from the Pennsylvania anthracites. With the boiler designed by General Meigs, there were only six anthracites and 25 bituminous coals tested. It happens that two of the semi-bituminous coals, both from Somerset County, Pa., give better results—viz., 9.85 and 9.75—than any of the anthracites; then follow four out of the six anthracites, from 9.37 to 9.07; then one of the Pittsburgh coals appears, 9.7; then the other two anthracites, 9.04 and 8.87, and then the second Pittsburgh coal, 8.78. The two Pittsburgh coals, which gave in these tests 8.78 and 9.7, showed in the Little Giant boiler test, even after dividing the results by the coefficient, only 6.74 and 7.84 respectively, the differences being respectively more than 23 and more than 13 per cent. This fact alone is sufficient to show the total unreliability of these tests. A Scotch and an English coal also, which, in the Little Giant boiler, after dividing by the coefficient, gave only 6.25 and 6.07 pounds, in General Meigs's boiler gave 7.61 and 7.52 pounds. The lowest coal on the list is a Dakota lignite, which gave 4.03 pounds evaporation. It gave 4.47 pounds in the Little Giant test, after dividing by the coefficient, and is the only coal in which an important difference in its favor appears in the latter test. Of the 25 bituminous coals tested in General Meigs's boiler, 22 show results below the lowest of the six anthracites. With both boilers the tendency of the figures is to place the bituminous coals in general far beneath the anthracites in evaporative power. In this I think the tests are utterly misleading and worse than worthless.

(To be continued.)

* Read at the Cleveland meeting of the American Society of Mechanical Engineers.

The Reading of Papers.

A recent issue of the *Engineering News*, referring to the annual convention of the American Society of Civil Engineers, says:

The advisability or non-advisability of reading "papers" at the annual conventions has been a bone of contention among members for years past. Some claim that this is the chief end of such meetings; that a "paper" should be read in all its length, no matter how ponderous, or how it bristles with mathematical formulæ; that it should be there discussed "if it took all summer;" that the social element should be frowned down, and, above all, that the "fair sex" should be forbidden to waste the valuable time of so learned a gathering; that they should be excluded, in fact, altogether.

We differ radically from the above malcontents. A "paper" can be studied with more profit in the quiet and privacy of one's own office; the discussion of the paper will be more profitable to others when the facts are first carefully weighed and compared with other data in our home library; such professional debate, from its very practical form, demands leisure, and cannot be successfully carried out in the midst of the detracting influence of a visit to a new locality, and surrounded by new faces and novel conditions. There is certain formal business that must be transacted at these annual conventions; let that be got through with as speedily and orderly as possible; read by "title," if you will, the papers of the year, but publish and discuss them in the "Transactions" of the society, or at meetings at home devoted to this purpose solely.

The annual convention is the annual "summer jaunt" of the majority of the members present; it is probably the only one their duties will allow them. They come for pleasure as well as profit, but the profit they would derive from sitting in a crowded room, having a paper read at them that but few can hear, and fewer still digest, in that shape, is questionable. The real profit, as we regard it, is to be gained from the "solid chunks of wisdom" that may be picked up in a social way with men whose lips would in many cases remain sealed during a public debate.

Railroad Construction in Russia.—Russia, says a St. Petersburg dispatch to the London *Times*, is making slow but sure progress in the construction of her railways.

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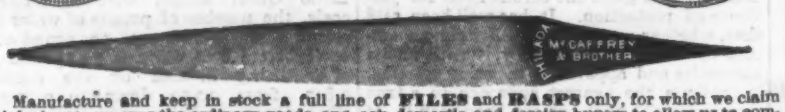

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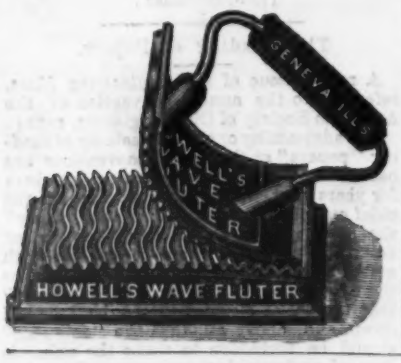

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[This Advertisement Changed Weekly.]

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Knife,
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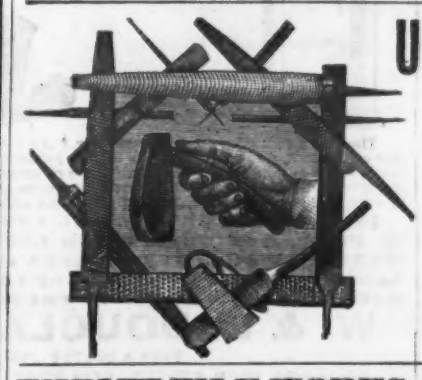

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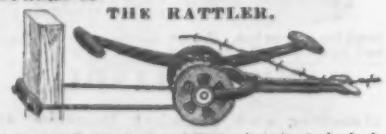

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HOME OFFICE, DE KALB, ILL.

We are continually hearing of new railways being projected or finished, most of which, it is true, are small branch lines. But the lines are generally of some commercial or strategic value. They are constructed partly for economical purposes and partly to give work to the immense number of Russian engineers who are without employment, and who, together with the whole of the Russian press, have long been bitterly complaining of the concessions granted to foreigners. The Government has apparently decided to give the preference in future to Russian contractors, and, if the requisite capital cannot be obtained from private sources, to grant large subsidies. At the present time the military railway battalions are being utilized to great extent, and have rendered valuable service. The Jabinsk-Pinsk Railway, 120 miles in length, was constructed by this corps, and although it was necessary to erect no less than 69 bridges, two of which were of considerable size, the whole line was completed in the almost incredible space of five months, and cost the Government only £3400 per mile. The Transcaspian-Kransnovodsk Railway is likewise making rapid progress, and will be completed as far as Cizil Arvat by the middle of June. In spite of the scarcity of materials and the obstacles presented by the Transcaspian steppe, the line will only cost about £4200 per mile. It has been found by experience that the storms and sand-drifts in the steppe cause very little damage to the railway, sometimes only delaying the train for a few hours.

Senator Voorhees, of Indiana, on Protection.

Senator Voorhees takes a position on the tariff question which we think is significant of a Democratic change of front. After expressing the opinion that his party is not likely to repeat in its 1884 platform the mistake of 1880, Mr. Voorhees says:

A tariff for "revenue only" is an impossibility. Any tariff that is laid must protect to some extent. If men want to advocate free trade, let them do it; but no one ought to be allowed to commit the Democratic party to that theory, for the party voters won't subscribe to it. The tariff operates as a tax. Free trade would do away with the Custom Houses, abolish the duties on imports and levy a direct tax on the people for the support of the Government. In other words, it would increase general taxes $200,000,000 a year, and people would have less to pay taxes with than they have now, for labor would be cheapened and industry discouraged. The people of Indiana won't help to bring about any such result. Taxes are already quite heavy enough, and are well adjusted. Industry is active and prosperous and labor happy. We owe largely to a protective tariff an industrial condition in Indiana whose annual product is $200,000,000. There is no State and no place in the world of the same territory that is as rich in natural wealth and opportunities as is Indiana. We want to develop under the best conditions, and with those which have so far favored us we are very well satisfied. We don't believe in helping monopolies or anything of that kind, but rather in a tariff system for revenue, laid with the idea of protecting home industry and in advancing us to the higher planes of wealth and prosperity. Look at our State and see how a tariff that protects has helped and will help us. We are the last State timbered with hard wood this side of the great Western forests. This has not only made our timber valuable, but has led to the manufacture in the State of wagons, plows, mowers, reapers and every kind of farm implements on a scale so extensive that market is found for them both in this country and abroad. Our furniture manufacturers ship to nearly every country in the world. They have taken first prizes for fine work wherever they have exhibited during the last 15 years. In the southern part of the State we have the largest glass factory in the world, at which, owing to a protective tariff, such progress in manufacture has been made that there is no glass of any quality superior to that which is turned out there. Our stone quarries and clay beds are as good as can be found. We have the best of coal that is mined. It was discovered only about 15 years ago, but its value was at once recognized, and now the bulk of the products of the Superior and Missouri iron mines is brought here for treatment. After paying transportation we are able to turn out iron at $13 a ton, against $19 at Pittsburgh. The coal fields cover an area of 7000 square miles, or one-fifth of the State. Their development has already begun. The block coal, as it is known, burns to ashes as white as hickory. It never cakes or runs together. These qualities enable the blast to force the flame through the contents of the furnace, thus avoiding danger from chilling, and reducing the ore without the preliminary process of cooking. We have to use no charcoal, as they do at Pittsburgh. This serves the purpose of both coal and charcoal. No coal has yet been discovered west of this State suitable for the manufacture of iron. This will develop our industry immensely, because, in addition to the present trade, the great West will soon be looking to us for their iron and steel, as the East looks to Pennsylvania.

We have here a town whose growth illustrates the result of a policy of protection. The place has been settled for 60 years. The population after 45 years was about 17,000. Then the nail factory and other industries started here, and the population has increased steadily at the rate of 1000 a year, so that within 15 or 16 years we have nearly doubled our numbers. Factories within a radius of ten miles give employment to over 5000 workmen, and they and their families furnish an active and hungry market to the farmers hereabouts for vegetables and the like. A market for corn was provided at a distillery, which until last winter used 4200 bushels a day, paying Chicago prices for it, sometimes more, and saving farmers transportation and delay. So we have a community here, as all over the State, which is happy and prosperous, and asks only to be allowed to continue so. There are not less than 15,000 manufacturing establishments in the State, employing at least 75,000 hands, nearly all voters. If any one supposes that any of these people, or the farmers who supply them food, or the tradesmen of whom they buy, will support a movement designed to strike at a system under which they flourish, and on which they are more or less dependent, especially when they know that a change to free trade would impose direct taxation as well as cheapen labor and hamper industry—I say if any one supposes this he will find himself much mistaken. There is no one in this State who believes in such a change. Talk of what Mr. McDonald or Mr. Hendricks may believe, other than what I have said is without substantial warrant. President-making is no concern of mine. My ambition is within and for Indiana. But when it is charged that the leaders here are of different minds regarding the great issues affecting the industries and prosperity of the State, I know better. The relations of Mr. McDonald, Mr. Hendricks and myself are cordial, politically as well as personally. The tariff plank in the State platform of last year declared for a revenue tariff, with incidental protection, designed to foster our industries. I wrote it, and Mr. McDonald stumped the State with me in its favor. The tariff planks in the Pennsylvania and North Carolina platforms were drawn in the same spirit, almost in the same words, and the people approve them, as they did here. The National platform must make similar declarations to carry the country. If it should, I can go through this State with it and get a Democratic majority of 12,000 votes.

What I said about the industries of Indiana applies with even greater force to the condition of the South. The iron wealth of Virginia yet undeveloped is larger than that of Pennsylvania. West Virginia, East Kentucky and Tennessee, Georgia and Alabama are all included in the great Eastern iron belt that begins in New York and has been the source of much of Pennsylvania's power. Manufactures are getting a foothold in the South. In the address I made at the opening of the Atlanta Cotton Exposition, I advised the people there to build mills for themselves, and thus keep at home the profits both of production and manufacture. They are doing it, and now turn out as good cotton goods of the coarser qualities as are made anywhere. This has given an impetus to Southern enterprise, and it will grow until that entire country will be demanding protection for her industries. An era of great prosperity is before the South.

The free-trade cry comes mainly from New England. That section has been protected so long as to be able to stand alone and compete with the world, and now wants to crush out all possible rivals in this country. The South, no doubt, is already making inroads on the New England trade in coarse cloths, and it would be a very nice thing for New England to get back that trade and be sure of holding it. Interests more powerful than New England's, however, will maintain a tariff that will recognize and encourage growing industries. Under this policy devised and carried on by the best minds of our history, part of the country has been made strong; the greater part still needs assistance. It is the policy *urged by Jefferson, Madison, Monroe, Jackson* and such men, and, I believe, is still favored by the mass of the Democratic party.

METALLURGICAL NOTES.

A Miniature Blast Furnace.

The *Journal* of the United States Association of Charcoal Iron Workers gives some interesting particulars relating to a miniature blast furnace, or rather cupola, which was erected in Freedom, Sauk County, Wis., a short time since. It is an iron shell, 5 feet diameter and 21 feet high, lined with fire-brick, so as to have the following interior dimensions: Diameter at bottom, 20 inches; diameter at top of crucible, 24 inches; hight of crucible, 48 inches; diameter at bosh, 40 inches; hight of bosh, 9 feet from bottom; diameter of tunnel head, 26 inches; total hight, 21 feet. It was provided with two 1½-inch tuyeres placed 20 inches above the bottom. Opening were cut in the shell to accommodate the tuyeres, water tymp and gas flue, the latter being formed of fire-brick 16 inches inside diameter, extending from the hearth level to within 2 feet of the tunnel-head, and rivaling in size the furnace stack itself. Ample boiler power and a 40-horse-power steam engine, which had done previous service at a tannery, were supplied, and at first connected with a fan-blower. This proved unsatisfactory, and a horizontal cylinder 18 inches in diameter and 22 inches stroke, which had been used to agitate beer in a brewery, was substituted with but little better results. An oven containing 14 small ox-bow, hot-blast pipes was also erected. The furnace has not been a success, and no attempt to continue the experiment has been made since February, although it is reported that a stack of larger dimensions is to be erected there. During the time a fan-blower was used the blast was cold—and weak. The hot-blast was added when the piston blower was procured. About 10 tons of iron were cast over the dam in the aggregate, mostly in the shape of scrap. The supply of ore is entirely local and of uncertain extent.

Utilizing Blast Furnace Slag.

Referring to the experiments now being made in Sweden to crush blast furnace slag into sand and utilize it for road and railway making, a contemporary remarks that this has been done to a considerable extent, notably in Eastern Pennsylvania. Large quantities of slag have been reduced to sand by running it hot from the furnace into a tank partially filled with water, a jet of water also playing on the molten stream as it fell. This granulated material makes good walks, and answers admirably for a top dressing for clayey wagon roads. It is, however, too light for railroad ballast. The Philadelphia and Reading Railroad have for several years utilized many thousand tons of blast furnace slag, which has been broken by crushers, and, in working over old cinder piles, have recovered considerable quantities of iron. The coarser portions of the cinder are used for ballast, and the finer particles are placed on walks, &c., about depots. About 50,000 tons of crushed cinder have been taken from the slag pile at Swede furnaces, and a crusher is still in operation

there night and day. Another method in use in the West is to run the slag out on gently sloping ground in thin layers, and then break down a number of these layers by bars.

SCIENTIFIC AND TECHNICAL.

Causes of Sharp Flanges on Car-Wheels.

A correspondent of the *Railway Age*, in commenting upon an article under the above head which recently appeared in that journal, submits the following, which will be read with interest: "In an article in your issue of May 24, on 'The Causes of Sharp Flanges on Car Wheels,' you say, first, 'the car builders may discover the cause thereof, but it is doubtful whether sharp flanges can be prevented.' Again, 'Let any one examine the steel rails on any well-traveled railway track, and observe the lamination of the rails, due to the heavy and continuous loads which are moved over them, and upon the inner and upper edges of the rails are projecting laminations—sharp, hard and many-edged surfaces—which cut into the base of the flanges of every car-wheel which passes over them. * * * The rail must continue to take the hammering. It is the under dog in the fight—it always has been, and evidently always will be. The "gouge" into the wheel is the only retaliation it makes. If the rail is continually flattened and pressed out by the load on the wheel, a flat tread will not remedy the evil, for if the rail yields in this manner under the traffic it carries we must expect the laminations and the consequent rough edges.' Sharp flanges are no doubt of frequent occurrence, and therefore a source of considerable expense on many railroads. I have heard it estimated as high as 30 per cent. of all the wheels removed on some roads, while other roads claim that they do not remove 3 per cent. There must be some reason for so great a diversity of experience. This reason is, I think, obvious, and is due almost entirely to the shape of the head of the rail upon which the wheels roll. Some rails are designed with the top-corners turned with $\frac{1}{16}$ inch radius, while others have $\frac{1}{2}$-inch to $\frac{5}{8}$-inch radius. All wheels when new have the curve connecting the tread of wheel with flanges turned with radius approximating $\frac{5}{8}$ inch. No practical man who has given the matter any thought but will see at a glance that on the former section of rail the wheels will be cut into at the junction of the flange and tread when the chill is thinnest, and the result is seen in straight and thin flanges until the rail is worn off to the radius it should have been made, while on the latter section so much of the rail and wheel section corresponds as to distribute the wear over a larger surface, thereby saving the wear of both wheel and rail and retaining their normal section while wearing away. What would be thought of a self-styled mechanic who would make a $\frac{5}{8}$-inch diameter journal bearing with the bottom of it half as thick as the sides, and then put a $\frac{1}{16}$-inch journal in it, and complain because the journal wore through the bottom instead of wearing equally all around? I have walked many a mile on a good many 'well-traveled railways,' but I never saw on any rail with top corner turned to an approximation of the shape of flange base, and such 'projecting laminations, sharp, hard and many-edged surfaces to cut into, &c.' The rail is flattened, and to some extent the metal is pressed out, and the tendency is no doubt to press it equally in both directions, but it is free to go outward, meeting with no obstruction, and while it may go inward to some extent, it cannot assume the 'many-edged surface,' because the flange of the wheel prevents it. I am aware that with a rail turned with much less radius than the junction between flange and tread, and with the inner edge of the rail head nearly vertical, the space between the rail and the flange where it does not touch may receive some of the metal that flows or is pressed out, but it can do no harm there, for as soon as it reaches the flange it is smoothed and goes to shape the head of the rail as it should have been originally designed. The writer of the article referred to admits that the 'outer rail of the curve has its inner and upper edge worn round and smooth.' This is due to the front wheel of the truck running against that rail, but he should not forget that the rear truck wheel runs against the inner rail of the curve though not pressing it so hard, and every one knows who has ridden in the rear of a train running at high speed on a tangent that the cars vibrate from one rail to the other, so that I see very little chance for these 'sharp, hard and many-edged projecting laminations' to thrive. I contend, therefore, that what is wanted to prevent sharp flanges is to have the rails made to conform to the shape of the wheel section, instead of having the wheels wear out to fit an improperly shaped rail. It is true 'the rail is the under-dog,' but it must not be forgotten that a 33-inch wheel turns around 611 times in each mile, so that the top dog is the greater sufferer. I am not prepared to say whether the cylindrical wheel will do away with these destructive tendencies of wheel and rail, but I do maintain—without intending to get into an argument on the merits of cylindrical or conical wheels—that the cylindrical wheel brings the bearing on the rail where it should be first—in the center of the head, instead of on the inner edge, tending to turn the rail and cut into the cross-ties; that it affords a more uniform bearing over the rail-head, that it will very much reduce the oscillations of cars running at high speed, and that it offers less resistance in passing curves."

The Hawley Steam Snow Plow.

An interesting piece of machinery on exhibition at the Chicago Railway Exposition was the Hawley steam snow plow and excavator. It consists principally of a large screw conveyor, working at a high speed inside of an iron box about 12 feet wide, open in front to receive the snow. As the plow is pushed forward by the locomotive behind it, the screw, which is worked by two powerful engines mounted upon standard trucks, can be run at a high rate of speed, cutting into the snow, lifting it to the roof and throwing it to either side of the track. The apparatus is said to have had a very severe test on its trial on the Toronto, Grey and Bruce Railway, where it opened a channel through a cut 150 feet long, filled with packed ice and snow to the depth of 6 feet. The machine on exhibition, the only one yet built, is 8 feet high, but one is being built entirely of steel, which will be 12 feet high with a screw 12 feet 6 inches in diameter. The standard locomotive boiler is used, also standard trucks. The machine will be 34 feet long and weigh 22 tons, having two engines with cylinders 14 x 16 inches. The company sells the right to manufacture and use the machine to railroad companies at $2 per mile of track operated. The cost of the machine is said to be about $2800.

The Porosity of Stone.

Experiments made some time since by Prof Doremus have shown that gas will readily pass through stone. A block of brown sandstone, 12 by 15 inches long and 4 or 5 inches thick, was used. A pipe was clamped on to the stone by means of iron plates, and this pipe connected by means of flexible tubes with the gas pipes. The remainder of the stone was painted over several thicknesses with varnish. Opposite to the point where the gas was applied there was another pipe for the gas to escape from. In a few moments a lighted paper applied to it caused a flame to appear, showing that the gas had passed through the stone.

Microscopic Organisms in Building Materials.

Porous materials, such as bricks of baked clay, are often observed to become friable or pulverulent to a variable depth on their exterior, and this occurs especially where the baking has not been sufficient. M. Parize, in dwelling upon this subject in *La Nature*, writes as follows: "This species of caries, thus begun, gradually enters the brick to a greater and greater depth, and ends by reducing it to powder. Up to the present time this phenomenon has been attributed to the action of moisture, to alternations of heat and cold, &c.; but from the observations which I am about to relate, it is probable that these agencies are merely secondary ones, and that they have the effect only of favoring the action of the true cause of destruction, which, from what follows, should, as a general thing, be referred to the development of microscopic organisms. One day, on examining some mucedines that had vegetated upon a brick partition in the interior of a closed apartment which was somewhat damp, I remarked that the plastering exhibited blisters or bubble-like projections at certain points. On puncturing one of these, there issued from it a very fine red dust that had resulted from a pulverization of the brick. I at once thought of the presence of larvæ or of insects, and therefore looked for these, with a lens, among the *débris*. Finding nothing, I had recourse to the microscope, and, under a magnification of about 300 diameters, saw in the midst of the *débris* of the diatoms and silicious algæ that had belonged to the clay from which the brick was made, an immense number of living microscopic organisms. The existence and propagation of these proto-organisms in such an environment, beneath a continuous layer of plaster 5 to 6 mm. thick, has a right to surprise us; and yet this is not all. Having cleaned the rotted surface of the bricks with a stiff brush, I drilled a hole therein about 30 mm. in depth, and examined under the microscope the dust taken from the bottom of the cavity. The same organisms showed themselves, but not in so great a number (about 100 per square centimetre of the preparation, instead of 150 that were met with in the first observation). All the bricks that exhibited the symptoms of deterioration just described offered the same microbes in varying number. The microscopic preparation was made, in each case, by dropping a pinch of the dust to be studied into a few drops of pure water or alcohol, and taking a drop of the supernatant liquid. The conclusions to be drawn from these facts are numerous. They show us, in the first place, that germs and spores may be preserved, so to speak, indefinitely, within surroundings that are eminently protective to them, and where no one up to the present time had dreamed of going to look for them.

Hence is explained the utility of the disinfecting processes that are employed in apartments, hospitals or stables in which cases of contagious diseases have occurred. The scraping and whitewashing of walls are the only prophylactic means that have, up to the present time, a known effect. It may be easily seen that these operations remove from the walls the permeable layer in which the parasitic germs have been enabled to establish themselves and multiply therein in a different stage of development from that under which they determine well-known morbid effects. Besides, these observations establish the fact that the *rôle* of the infinitely small is to be taken into account in the duration of buildings and other structures. We might possibly seek here the reasons for the rapid destruction of numerous Semitic monuments built of slightly baked or merely sun-dried bricks by the Assyrians and some other ancient peoples. Finally, this same cause may possibly play a *rôle* in the disintegration of schistose rocks, and of the agglomerates or clods that enter into the composition of arable soils."

A New Electric Accumulator.

A new electric accumulator which has recently been brought out in England by Messrs. Elwell & Parker, is described as follows by the London *Engineer*: Strips of sheet lead 9 inches wide and any convenient length, weighing 2 pounds to the square foot, are passed through a machine which first punches holes entirely through them and then impresses them with indentations, which act as distance pieces to keep the layers of each plate apart. The holes secure a free circulation to the electrolyte. These strips are then rolled spirally into cylinders containing, in the small cells, three thicknesses of plate each, the joints being made secure by fusing with a soldering-iron, and an anode of much thicker lead being fused on at the same time. Each cell contains eight of these cylinders $\frac{1}{4}$ inch apart. The lead cylinders are first placed in a bath containing a dilute solution of nitric and sulphuric acid, and left there for 24 hours. The effect of this bath is to minutely honeycomb the lead plates, putting them in the most fa-

H. D. SMITH & CO.,

Plantsville, Conn.,

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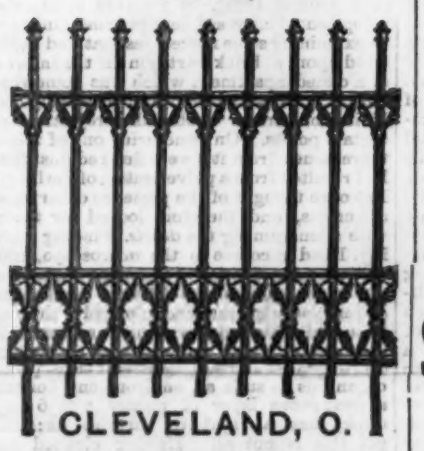

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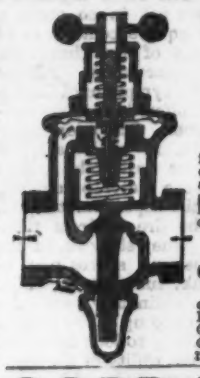

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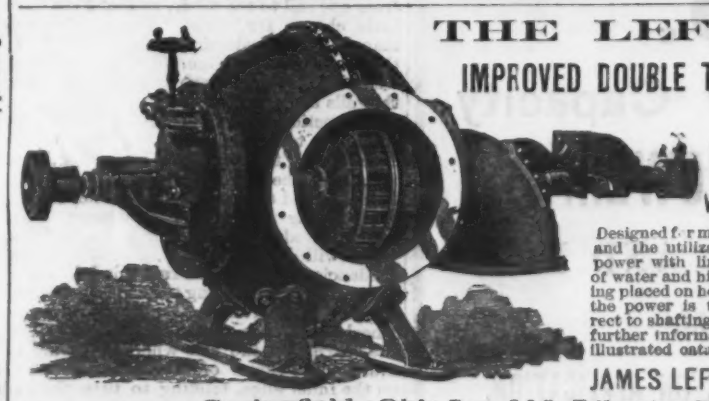

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vorable condition for "formation" by the electric current. There is also formed upon the surface of the plates a deposit of sulphate of lead, the greater part of which is subsequently reduced to peroxide, part of it being first washed off. The plates on being taken from the bath are washed, and then placed in the ordinary dilute sulphuric acid solution in the cell. They are then charged in one direction for six hours with a current of 12 ampères, discharged in about three hours through 10 Swan 45 volt, 20-candle lamps—22 cells give 45 volts—and charged again in the reverse direction. They are then ready for use. There is then no sulphate visible, the peroxide plate being a rich, dark brown color, of smooth, hard crystalline appearance, and the negative plate presenting a clean surface of ordinary lead color. The cells are coupled by clamping the electrodes together. The plates or cylinders are retained in position by notched vulcanite frames underneath, and notched distance-pieces of the same material on the top, thus leaving the entire space between the plates and a space underneath them open for the free circulation of the electrolyte. The period occupied for the cutting up of the lead strips to the complete charging of the battery ready to send out is only 48 hours. Earthenware cells are generally used, but the company manufacturing under the patent also use wood cells, coated inside with a composition of gutta-percha; these are preferable where strength and lightness are required. The quantity these cells will give out at an electro-motive force of two volts or rather more—same as the original Planté cell—is about 40 ampère hours when sent from the works; that is, supposing an accumulator is required to give a current at an electro-motive force of 45 volts, 22 of these cells will give a current of 10 ampères for four hours before any of the cell "give out." But the capacity of the cells may be greatly increased by occasionally reversing the charging currents, as in the original Planté cell. The cells are packed in small cases of three cells, carpet being slipped between the plates. They seem to travel safely thus.

A Big Blast.

For three months past, says the St. Louis *Globe-Democrat*, preparations had been making for a great powder blast in the granite quarries at Syenite, about 100 miles down the Iron Mountain Railroad and immediately south of the St. Francis River. The blast took place on June 21, when 4000 pounds of powder were discharged and over 50,000 tons of rock, by actual measurement, were lifted and turned over in masses convenient for cutting into pavement blocks, and some 20,000 or 30,000 tons more moved so as to make future quarrying operations comparatively easy. The place where the enormous blast took place, the greatest that has ever occurred in any quarry in the United States, was on the face of a granite hill fronting to the north. At or near the foot of this hill a cutting some 22 feet deep had been made for quarrying in the usual way, but after this depth had been reached the rock was found so tightly bound that an ordinary quarry blast had no effect on it, the force of the discharges coming directly out of the drill holes. Under these circumstances it was decided to run a tunnel from the bottom of the cut southward through the hill. This was done and an entrance made 86 feet into the body of the rock. When this had been done it was found that the tunnel, which had started from the bottom of the cut 22 feet below the surface, was 47 feet below, the rise of the hill accounting for the difference. Then at the extremity of the tunnel a chamber 8 feet in length was bored to the west, and about midway of the tunnel another chamber of the same length was bored to the east. In each of these chambers 40 kegs, or 1000 pounds of powder, were placed, and then rough masonry was built up in front of each chamber and down the length of the tunnel to about 20 feet north of the middle chamber, insulated wires being carried from each charge to the mouth of the tunnel and thence about 1000 feet over the crest of the hill to the electric batteries. The difficulty of the operation was largely enhanced by the heavy rains that have recently fallen. In fact, had it not been for the rains which continually kept flooding both tunnel and chambers the blast would have taken place three weeks ago. On Wednesday night, June 20, Mr. W. R. Allen, president of the granite company, was notified that the water had been pumped out and the mines charged, and that if nothing unforseen occurred all would be in readiness to fire the shot on Thursday afternoon. He consequently went down by the morning train and superintended the final operations.

The people in the neighborhood were considerably excited. There are about 1000 inhabitants of the village of Synite, and they were exercised about the safety of themselves and their houses. Most of them took the window-sashes out of their dwellings and carefully stowed them away in cotton or wool to prevent the blast smashing the glass, and some took the precaution of getting behind a hill about three miles away. It had been agreed that half an hour before the time for exploding the charges the steam whistle of the works should be blown, and when the shrill blast was heard, about 3.30 p. m., it was amusing to see the people scampering off over the hills to places of safety. The blasting party, headed by Mr. Allen, were the last to leave the cut. They picked their way quickly up the face of the hill, below which the volcanic charges lay, and finally reached the batteries. On their way from the point of danger care was taken to look out for and warn any stragglers who might have been found, but all seemed so well informed on the subject that nothing in the semblance of humanity could be seen outside of their own party. Having been thoroughly satisfied about the safety of others, Mr. Allen quietly took his cigar from his lips and said, "Shoot her off." The battery operator turned the key, while anxiety was depicted on every face. The dead silence that ensued seemed awfully long, and the first impression was that the whole thing was a failure, and several minds were wondering who would be the first to have the hardihood to go down into the mine. But just then, probably not half a second from the time the battery key had been turned, a slight quiver under foot was felt. The giant below had commenced his struggle. Then a low rumble, like the muttering of distant thunder; and then a loud roar which reverberated through the distant hills, and that was followed by the sound of falling rock in vast masses. This last sound was followed by the appearance of a vast volume of dense smoke which rose in great white columns and floated over the entire valley. The blast had been successful, and thousands of tons of rock lay ready for the hand of the stone-cutter, and so perfect had been the arrangements that no one was hurt. The actual measurements of the mass completely removed and broken up, as above described, or disturbed so as to make the granite convenient for future quarrying, are 100 feet south from the mouth of the tunnel by 200 feet wide, along and extending each way beyond the face of the cut, and 40 feet deep on the average. The calculation, therefore, shows 200 x 100 x 40—800,000 cubic feet, or about 70,000 tons.

Sales of Government Vessels.

Secretary Chandler, under date of June 21st, has issued a circular relating to proposals for the purchase of condemned Government vessels. According to this, sealed proposals will be received at the Navy Department until noon on Monday, September 24th, at which time and place they will be opened for the purchase of certain vessels which have been stricken from the Navy Register under authority of an act of Congress, approved August 5th, 1882, and which it is deemed for the best interests of the United States to sell. The vessels offered, their appraised value and their locality are:

At Portsmouth, N. H.			
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Kansas	6,100	Sabine	10,400
At Boston.			
Iowa	$44,600	Niagara	$29,000
Ohio	15,700		
At New London, Conn.			
Blue Light	$500	Florida	$64,000
At Sackett's Harbor, N. Y. (on the stocks).			
New Orleans			$200
At New York.			
Susquehanna			$9,000
At League Island, Pa.			
Burlington	$9,000	Glance	$400
Supply	1,200	Sorrel	200
Dictator	33,800		
At Washington, D. C.			
Frolic	$8,600	Relief	$2,600
At Norfolk.			
Worcester	$25,000	Shawmut	$5,300
Savannah	$10,600		
At Chester, Pa.			
Roanoke			$37,200
At Port Royal, S. C.			
Pawnee	$5,600	Sea Weed	$500

Proposals must be submitted in a sealed envelope, addressed "To the Secretary of the Navy, Washington, D. C.," and indorsed "*Proposals for the purchase of vessels*," so as to distinguish them from other communications. No offer for more than one vessel should be included within one proposal.

The vessels will be sold, for cash, to the person or persons, or corporation or corporations, offering the highest prices above their appraised value. Each bid or proposal must be accompanied by a deposit in cash (or satisfactorily certified check) of not less than 10 per cent. of the amount of the offer or proposal, and also a bond, with a penal sum equal to the whole amount of the offer, with two or more sureties, to be approved by the Secretary of the Navy, conditioned for the payment of the remaining 90 per cent. of the amount of such offer or proposal within 30 days from the date of its acceptance. In case default is made in the payment of the remaining 90 per cent., or any part thereof, within that time, said cash deposit of 10 per cent. shall be considered as forfeited to the Government, and shall be applied as directed in the act of March 3, 1883. All deposits and bonds of bidders whose proposals shall not be accepted will be returned to them within seven days after the opening of the proposals.

On application to the department a printed list will be furnished giving general information concerning the vessels; also forms of bids and bonds which must be used by bidders. The vessels can be examined at any time by applying to the commandants of the yards.

The purchasers must remove the vessels purchased from the limits of the yards or stations within such reasonable time as may be fixed by the department.

The Knights of Labor.—According to Pittsburgh advices, rumors have been current for some time past that at the next meeting of the general assembly of the Knights of Labor, which will be held in Cincinnati in August, the representatives of the Pittsburgh district, which is the most important in the order, embracing 100 square miles of territory and 80 local assemblies, representing as many different trades, will submit a proposition that the system of the organization be changed so that representatives of the different trades, instead of being massed into miscellaneous districts, be allowed to form districts in which only members of one trade will be eligible to membership. The report, which was repeatedly denied by the members of the order whose headquarters are in that city, is said to have been confirmed by one who is high in authority. The reason assigned by this gentleman for the change is that in that district, with its 80 assemblies, the representatives of some trade are always on strike, and others who derive no benefit are compelled to contribute to their support. He says the change was proposed a year ago and voted down, but that since then the feeling has become general that the order in its present shape is unwieldy, and that a change is necessary to prevent it from going to pieces. He expressed no doubt that this change will be authorized. The announcement of this programme has caused considerable excitement, and by many it is predicted that the trade organization, whose founders promised such wonderful things, is on the verge of disintegration.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, July 5, 1883.

DAVID WILLIAMS, . *Publisher and Proprietor.*
JAMES C. BAYLES, . *Editor.*
JOHN S. KING, . *Business Manager.*

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CONTENTS.

Range of Prices in Iron Products for Six Months.

We have made a careful study of the prices for leading iron products which have been quoted in our market reports from the beginning of the present year, and believe that our readers will be interested in the figures which we have collected and herewith present. These figures definitely and accurately portray the nature and extent of the shrinkage in prices which has been in progress during the first half of the present year. This shrinkage has affected all products, but the prices of some have fallen much lower in proportion than others. In most cases the reduction has been so severe as to cut down to the actual cost of production, if not lower. It is inevitable that such a shrinkage should have been accompanied with failures, but it is a matter for congratulation that these have not been very numerous nor seriously disastrous. The principal insolvents in the iron trade in the past six months were the Union Iron and Steel Co., of Chicago; the Bay State Iron Co., of Boston; John V. Ayers' Sons, of Chicago; James Marshall & Co., of Pittsburgh, and the Graffton Iron Co., of Ohio. The Union Iron and Steel Co.'s failure caused the suspension of the Fox River Iron Co., of Wisconsin, and the Kansas Rolling Mill Co., of Kansas. The failure of John V. Ayers' Sons caused the suspension of Brown, Bonnell & Co., of Youngstown, and the failure of the Graffton Iron Co. caused so much gossip concerning Graff, Bennett & Co., of Pittsburgh, that they were obliged to call their creditors together and procure an extension, although in possession of ample assets. Among the minor failures of the half year were those of C. W. Leavitt, of Phillipsburg, N. J.; Kloman Brothers, of Pittsburgh; the Kloman Iron and Steel Co., of Moundsville, W. Va.; Mumper & Co., of Barre Forge, Pa.; J. L. Edwards & Co., of Canal Dover, Ohio; the Greenwood Rolling Mill Co., of Tamaqua, Pa.; Wesley Wilson & Co., of Mahoning Furnace, Pa.; the Cleveland Furnace Co., of Steubenville, Ohio, &c. The Allentown Iron Co. also announced their determination to quit business because of the unprofitableness of the manufacture of pig iron.

These failures occurred at intervals from about the 1st of February, and they served to unnerve the boldest in the iron trade, causing at the same time a greater feeling of timidity among buyers than had previously existed, the result of which was seen in their purchasing merely from hand to mouth, carrying as little stock as possible. The pig iron market was particularly weakened at Pittsburgh in April by the failure of James Marshall & Co., which disclosed the unsavory fact that that firm controlled 57,000 tons of pig iron, which would have to be disposed of, and it was not known how soon.

But it happened that very little of the Marshall iron was thrown on the market, and that factor of depression gradually lost its force. A labor contest was expected to begin at Pittsburgh and other Western points on the 1st of June, compelling the stoppage of rolling mills, and the anticipation of that event caused the price of pig iron to weaken and of manufactured iron to harden; but the question was amicably settled, and that element of disturbance dropped out of sight. It was announced early in the year that railroad building would be very languidly pushed this season, but it happens that we are building more new railroad than was built in any previous year except last year, and the rail mills are full of orders, and the prophets of evil can extract no comfort from that quarter. The daily newspapers have for some time been influencing pig-iron buyers not to make purchases at present prices, by publishing wild statements of furnaces going out of blast wholesale, and hinting at the same time at the existence of immense stocks of pig iron in makers' hands, which would presumably be thrown upon the market soon by the embarrassed holders; but a high statistical authority exploded that story by showing authoritatively that furnaces were not being blown out at a panic rate, and that stocks were not by any means enormously large. The recovery from the depths of depression seems even now to be in progress, as foundry pig iron is in notably better demand at firmer prices, and there is an improved feeling in many other lines. We hope that the prices which we will now give have marked the lowest level which will be reached in 1883.

The following table shows the range of prices, highest and lowest, at New York City, per gross ton, for No. 1 anthracite foundry pig iron, old T rails, and No. 1 wrought scrap from yard, during the past six months:

	No. 1 anthracite.	Old rails.	W. ought scrap.
Jan.	$25.00 @	$24.00 @ 26.00	$27.00 @ 28.00
Feb.	25.00 @	24.00 @ 25.00	26.50 @ 28.00
Mar.	24.00 @ 25.00	23.00 @ 24.50	26 00 @ 27.00
April	22.00 @ 24.00	23.00 @ 24.50	26. 0 @ 27.00
May	21 50 @ 22.00	22.00 @ 24.00	25.00 @ 27.00
June	19.00 @ 22.50	22.00 @ 23.00	24.00 @ 25 00

In the time above covered some sales at exceptionally low prices were made in this city or in near localities. In March a sale of old rails from store at $21 was made. In the first week of June a sale of old rails was made at Bridgeport, Conn., at $20.50. In March sales of wrought scrap from ship were made at $24, in May at $23.50, and in June at $22.

The highest and lowest prices in the past six months at Philadelphia for No. 1 anthracite foundry pig iron, foreign Bessemer pig iron, refined bar iron, ship and tank plate, sheet iron and steel rails were as follows:

	No. 1 anthracite. Per ton.	Foreign Bess. pig. Per ton.	Refined bar iron. Per lb.
Jan.	$24.50 @ $26.00	$22.50 @ $23.00	2.3 ¢ @ 2.4 ¢
Feb.	24.50 @ 26.00	22.00 @ 22.50	2.2 ¢ @ 2.4 ¢
Mar.	23.00 @ 26 00	22.00 @ 22.50	2.15¢ @ 2.3 ¢
April	22.50 @ 25.00	22.00 @	2.15¢ @ 2.25¢
May.	20.00 @ 24.00	21.25 @	2.05¢ @ 2 25¢
June	19.50 @ 23.50	21.00 @ 21 37½	2.05¢ @ 2.25¢

	Ship and tank plate. Per lb.	Common sheet. No. 26 to 21. Per lb.	Steel rails at mill. Per ton.
Jan.	2.5 ¢ @ 2.6¢	4¢	$40.00 @ .....
Feb.	2.5 ¢ @ 2.6¢	3¾¢ @ 4¢	33.00 @ 40.00
March	2.5 ¢ @ 2.6¢	3¾¢	39.00 @ 40.00
April	2.25¢ @ 2.6¢	3¾¢	38.00 @ 39.00
May	2.3 ¢ @ 2.5¢	3¾¢	38.00 @ 39 00
June.	2.3 ¢ @ 2.3¢	3¾¢	37.50 @ 39.00

The following tables show the highest and lowest prices at Pittsburgh for various products, including coke, which is, however, quoted at the oven and per net ton of 2000 pounds:

	Neutral forge pig iron.	Bessemer pig iron.	Old rails.
Jan.	$20.50 @ $21.00	$22.50 @ $23.00	$26.00 @ $28.00
Feb.	19.50 @ 21.00	22 50 @ 23.00	25 50 @ 27.00
Mar.	19.00 @ 20.50	22.00 @ 22.50	26.00 @ 26.50
April.	18.50 @ 20.00	22.00 @ 22 50	24.00 @ 27.00
May.	17 50 @ 19.00	21.50 @ 22.00	22.00 @ 24.00
June.	17.50 @ 18.50	21.00 @ 21.50	22.50 @ 25.00

	Bar iron per pound.	Cut nails, gross price per keg.	Coke at oven, per net ton.
Jan.	2.15¢ @ 2.25¢	$3.40 @	$1.25 @ .....
Feb.	1.9 ¢ @ 2.25¢	3.40 @	1.15 @ $1.25
March.	1.9 ¢ @ 2.0 ¢	3.40 @	1.05 @ 1.15
April.	1.9 ¢ @ 2.0 ¢	3.10 @ $3.40	1.05 @ .....
May.	1.9 ¢ @ 2.1 ¢	3.10 @ 3.15	.90 @ 1.05
June.	..... @ 2.0 ¢	3.00 @ 3.10	.87½ @ .95

In connection with the above figures, it may be mentioned that our Pittsburgh correspondent states that a round lot of Bessemer pig iron could probably be purchased at lower figures than are above quoted. Old rails have stiffened considerably in the past month. The lowest prices for bar iron are usually those accepted for desirable orders, which include a fair sprinkling of extras. The price of nails was held up for nearly four months of the present year by concerted action of the Western makers, who suspended their works almost without exception from January 15th to February 10th, and also for two weeks in March, thereby keeping the supply about equal to the demand. In March and April, however, it was found that Eastern makers were offering nails in the West at much lower prices than those charged by Western makers, and the latter were then obliged to make a reduction to preserve their trade. The price of coke has fallen to a figure never before known, but the producers have agreed to restrict their output, and the result will shortly be seen in an advance in quotations to a price which will at least cover cost.

An element of serious disturbance in the iron trade of various sections of the country in the past few months has been Southern coke pig iron, which has appeared as a competitor for business both in the East and in the West, and has been received with favor on account of its relative cheapness. In January and February there seemed to be danger that its low price would cause complete demoralization at certain trade centers, but in March the Southern furnace owners jointly advanced prices, which restored the market to a condition of comparative steadiness. The principal point of distribution of Southern coke pig iron is Cincinnati, at which point the price ranged as follows:

January.	$21.50 @ $23.50	April.	$20.00 @ $21.50
February.	20.00 @ 23.00	May	20.00 @ 21.50
March.	21.00 @ 22 50	June	19.00 @ 21.00

Our series of prices would hardly be complete without embracing quotations for charcoal pig iron at various centers of consumption or sale. It may be said, in view of the fact that on the 1st of January the stock of charcoal pig iron in the hands of the makers was almost one-fourth of the total production of last year, that the price of charcoal pig iron has held up remarkably well, the lowest prices having been realized for Southern irons at Chattanooga and St. Louis. The range of prices has been as follows:

	Cincinnati. Best H. R. Foundry.	Louisville. No. 1 Southern.	Chicago. No. 1 L. S.
Jan.	$26.00 @ $26.50	$23.00 @ $24.00	$25.00 @ $26.50
Feb.	25.00 @ 26.00	22.50 @ 23.50	24.50 @ 25 00
M'ch.	25.00 @ 26.00	22.00 @ 23 00	24.00 @ .....
April	25.50 @ 26.00	22.00 @ 23.50	24.00 @ .....
May.	25 00 @ 25.50	22.00 @ 23 50	23 50 @ .....
June.	25.00 @ 25.50	21.50 @ 23 50	23.00 @ .....

	Chattanooga. No. 1 Southern.	St. Louis. No. 1 Missouri.	Richmond. Cold-blast Virginia.
January.	$22 @ $23	$21 @ $22	$27 @ $25
February.	22 @ 23	21 @ 22	27 @ 29
March.	22 @ 23	21 @ 22	27 @ 29
April.	22 @ 23	21 @ 22	27 @ 30
May	19 @ 23	21 @ 22	26 @ 29
June.	19 @ 20	20 @ 22	26 @ 28

The St. Louis pig-iron market seems to have been seriously out of joint in the past few months. Quite a large block of charcoal pig iron suitable for Bessemer purposes was sold there as low as $19 per ton, and early in the month of June, Messrs. Hoffer & Co. reported "a panic in Southern coke irons," with "prices at odds and ends, and not fairly quotable."

In connection with the prices of charcoal pig iron, it will be of interest to state the prices of charcoal blooms at Philadelphia, which have been as follows, per bloom ton:

January.	$64.00 @ $68.00	April.	$63.00 @ $63.00
February.	64.00 @ 66.00	May.	59.00 @ 62.50
March.	63.00 @ 63 00	June.	57.50 @ 61.00

Senator Voorhees, of Indiana, has been talking in a very sensible fashion about the proper and probable attitude, in the next Presidential canvass, of the great political party with which he is identified. He thinks the Democratic party will not again commit the mistake which undoubtedly led to their defeat in 1880, for the reason that their shibboleth, in addition to inviting defeat, was in itself considered nonsense. "A tariff for revenue only," Senator Voorhees says, "is an impossibility. Any tariff that "is laid must protect to some extent. If "men want to advocate free trade, let them "do it; but no one ought to be allowed to "commit the Democratic party to that "theory, for the party voters won't sub-"scribe to it." This commends itself to us as a very wise and practical view of the matter. The British tariff of imports is as nearly a tariff for revenue only as could be devised, but it operates as a heavy protection to the brewing and one or two other interests, and however duties might be adjusted they would afford protection to something. Senator Voorhees takes the broad view that protection under a tariff is in itself desirable, and that the country has enjoyed a prosperity under a tariff for protection which would have been impossible without it. He believes that the Democratic party will declare for a revenue tariff with incidental protection to domestic industry. If this declaration is made in good faith it will put a stop to a great deal of nonsense which has lately emanated from gentlemen connected with that party, who evidently believe that the people of this country want free trade, and who cannot be convinced that they do not, even by the unmistakable lessons of experience.

The Tariff and Trade.

The new tariff which went into effect on Monday of this week has cost the country more than we should care to estimate. The business stagnation, attributable chiefly, if not wholly, to this cause began to be severely felt about the time that the Tariff Commission submitted its report; the final acceptance of the Senate amendments administered the *coup de grâce* to business confidence, and it has taken all the time since then to effect the adjustments involved in changes in the rates of duty. Now that the time for the application of the new tariff has come, it is not surprising that the change is effected without shock or disturbance. The effect of a change of rates has been so completely discounted in all lines of business affected, that unless the Treasury officials shall discover in the law a different meaning from that which it seems to have for the practical business men who have been studying it during the past few months, the losses and disappointments of the winter and spring will have paid the cost of a revision which has hurt everybody, more or less, and helped nobody at all. Goods on which the duty is increased, such as wines, woolens, dress goods, &c., have been withdrawn from bond, while those on which the duty is lowered have been allowed to accumulate in warehouse. This substitution has been so gradual, however, that the work of the Custom House is going on as usual. In the general markets prices have declined so low that any change is likely to be in the direction of an upward movement.

It is generally expected that the first week in July will mark the beginning of an improvement in business. We certainly hope this will prove true, and there are already many indications of a better feeling. The iron market, after a depression which cannot be explained on any other ground than a loss of public confidence in the future development of our domestic industries, shows signs of a revival which is equally difficult of explanation, unless we attribute it to the fact that these industries find themselves less seriously hurt than they feared. So far as the changes in the rates of duty are concerned, they cannot at present affect the market, although in future they will operate to keep the level of prices somewhat lower than the average of past years. The metal trades are also exempt from any present embarrassment from this cause. It is scarcely probable that the consumption of tin plates will be increased by the reduction of duties, as all that the country needs have come in under the old rates. Whether importers or consumers will get the benefit of the reduction remains to be seen. Our copper surplus for export is somewhat too large to leave room for importations, and the other metals are not likely to be presently affected. Before the end of the year we shall have opportunity of noting the practical effect of the changes, and of observing how the Treasury Department officers will construe those portions of the law which are more or less ambiguous.

As our readers are aware, we were not in favor of such tariff revision as resulted from the adoption of the Senate bill. The draft of a bill submitted by the Tariff Commission was in many ways better adjusted to the wants of the country than the Senate bill, and could have been adopted with much less disturbance of the business of the country. However, the best interests of the country were not considered, so far as could be judged from the action of Congress, and the present law was passed and approved. Now that it has come into operation, we can only advise our readers to meet the issue thus forced upon them as cheerfully and hopefully as possible. It is the duty, as well as the interest, of every manufacturer to do what he can to restore confidence and overcome the artificial conditions which for several months past have operated to neutralize natural conditions in many respects extremely favorable to trade. So far as we can judge, the immediate outlook is very far from discouraging. None of the essential elements of national prosperity are lacking. We could scarcely expect anything different from what we have experienced, pending a change in tariff rates involving a more or less general readjustment of costs and prices; but now that the dead line is passed we hope that a better feeling will show itself in all departments of trade, and that prosperity during the last half of the year will, in part, at least, compensate for the losses and disappointments of the first half.

Comparative Blast Furnace Practice.

The paper by Mr. W. Hawdon, on a comparison of the working of a blast furnace with varying temperatures of blast, which we publish in another part of this issue, will be read with much interest by many of our readers. Although, as stated in the introductory remarks of the paper, the subject of the value of high and low temperatures of blast has already received much attention, and has been so often discussed as to be considered thoroughly exhausted by some, Mr. Hawdon shows that the matter is still capable of being studied with profit and interest. His remarks embody an extended practical experience gained in connection with large furnaces, and with temperatures of blast varying from 1000 to 1400° F., and, having had facilities in thoroughly investigating the subject, the results submitted are entitled to special attention. The plan adopted by him for comparing the work done with different temperatures of blast was to embody the output of the furnace and the yield of materials per ton of iron of periods of some weeks in tables, giving also the temperatures of the blast and the gases during each period. The figures thus obtained by Mr. Hawdon are suggestive, showing that with increasing temperatures of blast (above 1000° F.) a greater output of iron and a gradual diminution in the consumption of fuel is experienced, and thus conclusively demonstrating the lack of foundation for the assertion sometimes advanced that, with temperatures of blast beyond 1000° F., no further economy in fuel would result.

In one case only, and that when the temperature of the blast was 1400°, did Mr. Hawdon find a decrease in the output of iron as compared with the result when a lower temperature was employed. But this was accounted for by short stoppages for repairs of the furnace, thus restricting its actual working time. Pursuing his experiments still further, Mr. Hawdon took steps to ascertain whether or not the escaping gases were affected by the increased temperature of the blast. It was found that an increase in the latter produced a decrease in the former, or, in other words, a decrease in the amount of fuel used resulted in a decrease of the temperature of the gases. These determinations, judging from the information at hand, were carried out with great care, and may therefore be accepted as giving a fairly accurate account of the existing conditions. The volume of the escaping gases was also found to be the smallest when the higher temperatures of blast were used, since in such cases the amount of fuel consumed was smallest, and consequently the amount of air blown in to consume this fuel was correspondingly small. From this it naturally follows that with low temperatures of blast the volume of the escaping gases is larger, the amount of fuel consumed and the amount of air blown into the furnace also being larger Finding, then, in every case, that with higher temperatures of blast a diminution in the fuel consumption and increased make of iron are obtained, Mr. Hawdon makes an interesting comparison as to the ratio of heating surface to cubical contents of pipe and fire-brick regenerating stoves, calculating at the same time whether it is worth while pulling down old stoves at any particular stage of wear and tear, and replacing them with brick-heating stoves of the Cowper, Whitwell or similar type. This calculation, which, we would incidentally remark, naturally yields a result strongly in favor of brick stoves, presents numerous features of interest, and will repay a careful perusal. Results of a number of analyses of the gases escaping from the furnace considered, and also the calorific value of the various sources of heat supply, are submitted in an appendix given at the end of the paper.

The system adopted by Bradstreet's Mercantile Agency, of reporting business failures by trades, is an important improvement over any method hitherto followed in the compilation of such statistics. It is much more instructive to a student of the business situation than the statistics of failures by States or general geographical divisions. Believing that it is the desire of this company to make their statistics as valuable as possible, we venture a few suggestions which we think will still further increase their usefulness and interest. For example, in the table elsewhere given, we find "Hardware, iron, steel, &c.," as one item. This is somewhat too broad a generalization to have much value. It would be of great interest to have the figures opposite this item presented in several subdivisions. The hardware trade is a very important interest, and we should like to see it put down by itself, with two subdivisions of its own. Thus:

Hardware.
Manufacturers.
Dealers.

The items iron and steel might also be subdivided in the same way, if it were desired to give the figures a real value. This is true of some other items, but by no means of all of them. Out of 47 items in the table, only 17 could with advantage be so subdivided as to show the relation of failures among manufacturers to those among dealers. But the comparison thus rendered possible would be very instructive, and would give such statis-

tics a value far greater than they have ever had. It would show the relative condition of every important industry and trade in the United States, and, by giving warning of the weak places in our industrial and commercial system, would be of the greatest aid to those who have the management of credits, as well as to those desiring the information needed to enable them to shape their business policy wisely and intelligently. With the very perfect machinery at the command of Bradstreet's Agency, the subdivision of items, when such subdivision is likely to add greatly to their value, would not entail labor in proportion to the resulting benefit.

The Outlook for the Stove Trade.

Among the manufacturers assembled at Niagara during the past week, it is probable there were a majority who came there filled with gloomy forebodings as to the immediate future of the trade. The idea seemed to find quite general acceptance that the trade is suffering from overproduction, and that nothing less than a small-sized cataclysm can be expected to right it. Whether these gentlemen went home feeling any better than they did when they came we do not know, but there is reason to hope they did.

We presume that on this, as on other subjects connected with the stove business, one man's opinion is almost as good as another's. One man's opinion on the relation of production to consumption may be more reasonable than another's, but we lack the data to prove the one or disprove the other. To know whether or not there can be said to be an overproduction of stoves, we must know what is the normal statistical relation between demand and supply. If we try to reason this out, we are likely to reach surprising, and, in fact, incredible, conclusions. For example, the population of the United States may be assumed to be 55,000,000 people. This will certainly be admitted to represent 10,000,000 of families, as there are probably more families to the total population than would be represented by the ratio of one to five. Ten millions of families may therefore be assumed with safety. To each family we may allow two stoves—a cook and a heater. This average is arbitrarily assumed, but it does not seem excessive. Most families using stoves at all have more than two, and all have one. Now, let us assume that there is no original demand to supply, and that the trade for this year will be limited to the actual consumptive demand for renewals. What should it amount to statistically? There is some uncertainty as to what figure should be taken to represent the average life of a stove. Some classes of stoves undoubtedly last longer than others, but if all are taken together, the average cannot exceed ten years. Following this calculation, we find that one in ten of the 20,000,000 stoves in use, or 2,000,000 stoves, will this year be needed by consumers to actually replace those worn out in service.

Two millions of stoves for replacement alone seems to be a large total, but it would be difficult to find serious fault with the items of our estimate. Ten years is an excessive estimate of the average life of stoves, and an annual demand for 2,000,000 for replacement is apparently within the truth. Let us cut it down, however, and accept 1,750,000 stoves as a fair estimate of the consumptive demand for replacement alone.

Now, what allowance shall be made for an original consumers' demand? The annual increase of our population is, say, 3 per cent. But an original demand comes from other sources than the increase of population. The subdivision of families is of more importance, as affecting the consumptive demand for stoves, than births and immigration together. Every two persons married found a new family with original wants, and this subdivision does not, as the rule, diminish the consumptive requirements of the two previously existing families from which they have separated. Actual increase and immigration also count for something. We do not know just how much they do count for, but it is safe to assume that it is enough to restore our estimate of actual consumption to the total of 2,000,000 stoves of all kinds. We think no statistician in the trade will find cause to quarrel with these figures, and we doubt very much if any one could figure up the foundry capacity of the country to equal a production of 2,000,000 stoves. The largest figure we have ever heard as the result of actual calculation places the net capacity of our foundries at about 1,750,000 stoves, and several well-informed stove men who have figured on this question have affirmed that 1,250,000 would come much nearer the truth. Now, all this may be very misleading, but it would be difficult to show in what way our calculation is seriously at fault. Our figures would seem to indicate that the production of stoves this year is likely to be from 250,000 to 750,000 short of the actual consumptive demand. Probably this will not be found to be the case, but unless our estimate of production is far below the truth, we should not do violence to the probabilities in assuming that there will be no serious disproportion between production and consumption.

That trade thus far this year has been unsatisfactory is due to various causes, some evident and some difficult of explanation. The unsettlement of general trade resulting from the revision of the tariff and the change of rates to take effect July 1 have had a good deal to do with it. So many interests were unfavorably affected, especially those consuming iron and steel, that people became apprehensive, and a general expression of distrust created a general feeling of uneasiness. All branches of trade in some degree sympathize with each other, and what affects one affects all to a greater or less extent. Again, the unseasonably cold weather of the early summer was unfavorable to trade, and discouraged purchases which might otherwise have been made. People generally continued their kitchen arrangements on the winter basis until warm weather came, and then the oil or vapor stove helped to tide them over another season. To this extent, and probably no more, has the spring trade in coal and wood stoves been affected by the admitted large sales of vapor and oil stoves. This class of goods supplements, but nowhere supersedes, the other class. A housewife will buy a cook stove and an oil stove, but never an oil stove instead of a cook stove, with a view to dispensing with the latter. Oil and vapor stoves are distinctively summer goods, and we see no reason to expect that they will ever seriously affect the coal and wood stove trade, unless by extending more or less the life of cast-iron goods by the reduced wear and tear resulting from summer disuse.

But what of the fall trade? As we said at the outset, a majority of the gentlemen who assembled at Niagara this week seemed to have very little hope for the future, while a few were confident that the volume of trade would be large and prices well maintained, unless weak-kneed manufacturers become demoralized before the season of distribution has fairly begun, and slaughter their stocks through fear of inability to sell or carry them. So far as we can see, this is the only serious danger which menaces the trade. In other respects the outlook is far from discouraging. After July 1st business men will realize that the effects of tariff changes have already been discounted, and confidence in the stability of values will revive. The promise of the crops is full of encouragement, and it is somewhat late to expect any serious damage to them from any cause. In most lines of trade dealers throughout the country are carrying light stocks, and look forward to a liberal replenishment in anticipation of the fall and winter distribution. The working classes are all employed at good wages, the agricultural classes are prosperous, and everything seems to favor a normal consumption of all classes of merchandise. The large number of failures reported from week to week will be apt to discourage speculation and make all classes of merchants cautious and conservative. The present mortality among weak concerns only illustrates the law of the survival of the fittest, and does not show an unsound condition in general business.

So far as the stove trade is concerned, we do not see any reasons why it should not be good, and none have been presented by those who have prophesied evil which seem to satisfactorily explain their fears. The statistical position of the stove trade is by no means discouraging. According to the best data obtainable—data accepted by the best informed manufacturers as approximating the truth—the situation is not such as to warrant a discouraged feeling. As compared with last year, sales from foundry up to June 15 show a decrease of 7½ per cent. The stocks in makers' hands will probably average 12½ per cent. greater than at this time last year. They would have been much heavier than they are if interruptions from one cause or another had not kept production fully 5 per cent. below that for the corresponding period of last year. So far as dealers are concerned, it is probable that the stocks they are carrying are no greater than at this time last year, and some estimate them less. These are not our own estimates, but we are willing to accept them as probably as near the truth as any we can get. In tabulation it is a rule among statisticians to substitute 5 for any numeral concerning which they are uncertain. When the figure may be 1 or 9, 5 is as near the fact as one can get by guessing. Perhaps these percentages are calculated with a liberal use of fives for uncertain figures, but, however this may be, they are as nearly authoritative as anything we have. On the whole, they cannot be said to be discouraging. We have seen the stove trade in a great deal worse condition than it is to-day, and the manufacturer who may be tempted to sell his goods at a loss for fear of not selling them at all, had better think twice before he thus deliberately blights a season which now gives promise of being fairly satisfactory. Up to this time prices have been very well maintained. It is to the interest of dealers, as well as manufacturers, that they be kept where they are. In a time of demoralization, when prices have no basis, there is no money in the business for anybody.

Some interesting particulars as to the wage payments and earnings of the companies engaged in the iron and steel trades of Germany have just been issued by the German Iron and Steel Manufacturers' Association. Schedules were sent to different German iron and steel works, foundries and engineering works, and, from the answers returned by 325 firms from all parts of the empire, it appears that these firms employed in January, 1879, 153,979 laborers, with 9,383,396 marks (about $2,233,248) monthly wages, as against 206.150 laborers, with 14,754,350 marks ($3,511,535) monthly wages, in January, 1883. In January, 1879, the monthly wages of a laborer was 60 m. 94 p. (about $14.50), this amount having increased in January, 1883, to 71 m. 57 p. ($17.03).

The National Exposition of Railway Appliances.

Few people who have read the newspaper reports of the Chicago Exposition have very accurate ideas of what it really was, or what its relative merits were. In some quarters a very general impression prevails that it was rather a cheap affair, and only an excuse for bringing together certain things and making the whole scheme merely an advertising dodge. Others have spoken well of it, but with so much of laudation that people have come to the conclusion that it was newspaper buncombe rather than dispassionate judgment. A casual visit, however, showed that the exposition was one which not only deserved the name of "national," but "international" as well. Everything connected with railway matters was illustrated, and the illustrations were representative. Whether it was locomotives, steam cranes, cars, car wheels, frogs and switches, tools, or paints and varnishes, the exhibit was of a character creditable alike to the exposition and the manufacturers, and it is a notable fact that all the leading manufacturers in the country were represented in all departments. The character of their exhibits would strike the most casual observer as being entirely different from that usually put up for display at the annual fairs of the various cities where such fairs are held. The machinery was costly and the lines exceedingly complete. Another feature which, to say the least, was unusual, was that with almost every exhibit was found not simply a showman hired for the occasion, but some member of the firm or leading man of the establishment ready to display the goods or explain the operation of the tools, and, as the phrase goes, to "talk business," if such a thing should be necessary. Although the attendance of the general public was not particularly large, yet we doubt whether any exhibition ever had an attendance which was more valuable to exhibitors. The Master Car Builders, Mechanical Engineers, the Civil Engineers and the Master Mechanics in turn visited the exposition almost in a body, so that those to whom it was of the greatest advantage have seen the exposition, and the exhibitors have had an attendance that has been of the greatest value to them.

In the department which might almost be termed that of "Antiquities," the exhibition was surpassingly interesting, and here the railroad man could spend hours profitably studying the growth of locomotive engines. Most people are familiar with these old relics by means of photographs and engravings, there being very few which have not been more or less before the public in this form. Yet the visitor, standing face to face with these old relics for the first time, even though he may be perfectly familiar with their photographs, was struck by a certain novelty about them which is somewhat difficult of explanation. The wooden pins, the worn brasses, the queer, odd shapes of the details, the realism of the rude blacksmith work, the strange, patched-up smoke-stacks, or the quaint, plain finish of the passenger cars, were exceedingly striking, and could not be conveyed by an ordinary photograph nor by any description. That such old machines are still in running order after so many years' abuse, and dating back, as they do, to the very beginning of railway building, is a strange commentary on the rapidity with which the railroads of the country have developed.

One of the notable features distinguishing this from any other great exhibition which has been held in this country was the brilliancy at night. Since the Centennial immense strides have been made in electric lighting, and as the electric-light companies were in great force, lights were everywhere, large and small, arc lights and incandescent, and the scene was in consequence far brighter than would be possible with any method of gas-lighting. The Edison and Weston exhibits were a perfect blaze of light, and they illuminated the space all about them, not quite, perhaps, as brilliantly as daylight, but certainly far above the brightest moonlight. Arc lights all over the buildings made every corner bright. Around the gallery, a distance of nearly two-thirds of a mile, a track had been laid, and an electric motor drew a car, which at every trip was packed with sightseers. It was from this point that one got the best idea of the magnitude and completeness of the exhibition. Many of the exhibits, like those of the electric-light companies, the windmill and water-tank people, were very striking, as were also those of the paint and varnish men. As usual, the machinery in motion attracted a crowd of people, most of whom were sightseers, but elsewhere there was a conspicuous absence of crowding. In one respect the exhibition differed materially from that of the Centennial. Most of the exhibits were open, and the visitor was at liberty to walk in and examine. Viewed from above, one saw in almost every space some one or two persons intently examining details of machinery or methods of operation. This feature was a remarkable one, and showed how many persons practically familiar with the different branches were inspecting exhibits thoroughly and with a purpose. Even about the steam shovel, which was one of the most striking exhibits in the yard, one would find in the crowd which gathered around it when in operation a large number of men who were viewing it with a critical eye, and not as a wonderful exhibition of the triumph of man over matter. The speed with which it went through the motions of swinging into the bank, taking up a shovelful of gravel, raising the bucket, turning it to the car on the side track and dumping it, was something that even those who were familiar with such machines could not fail to admire. In the departments devoted to iron and ironworking there were numerous exhibits of special interest, not only to the practical ironworker, but also to the thinking man. Special shapes and sizes were to be found everywhere. Forms which once were too complicated or too large to be found in the market were here exhibited as part of the regular work of different iron and steel companies. The mechanical engineer looked these over with the greatest interest, and speculated on the advantages which would be brought about in construction when a few steps more had been taken and these larger plates and bars should come into the market in common competition with built-up work of a similar size.

The Exhibits.

The Otis Steel Works had two plates on exhibition that were worth the visitor's attention. One of them was ¼ inch thick by 72 inches wide and 372 inches in length; the other ⅜ inch thick, 56 inches wide and 625 inches long. They also exhibited a boiler 72 inches in diameter, in which the bottom plate is of a single sheet of steel measuring from side to side across the top 70 inches. The length of the sheet is 21 feet and 5 inches. The boiler is one of six which they are building for their own works. All three of the sheets were apparently as perfect as those of more ordinary sizes. They had also a steel boiler front made in one of the Government shops, with three flanged openings for furnace doors and a flange all around the top and sides. It contains four large and four small hand-holes, in addition, and is as perfect a piece of flanging as one could wish to see, the thickness having, so far as we could measure it, been preserved throughout.

The North Chicago Rolling mill Co. had a standard 120-foot steel rail, 65 pounds to the yard. The card upon it said, in effect, that the time of making it into a finished rail ready for shipping was one hour and 30 minutes. The same works also exhibited 60 and 90 foot rails.

HORSE, STEAM AND CABLE CARS.

The Central Support Car Truck Co., St. Louis, Mo., exhibited a three-truck car. These three-truck cars, with a truck of the ordinary pattern, they have the central truck carried on eight friction rollers. The transom moves with the truck, and is not fastened to the body. The capacity of the car is 70,000 pounds; length, 33 feet, and weight, 32,300 pounds. The car body is heavier than the standard by two tons, the weight of the extra truck. Otherwise it is the standard car and truck of the Missouri Pacific Railroad. The truck deserves mention for one feature that is frequently omitted in a truck with wooden transoms—that is, the timber is so arranged that shrinkage can be allowed for, and, by screwing up the nuts, the timbers can be made firm, even after a considerable shrinkage in the timber.

J. C. Brill & Co., Philadelphia, exhibited a "parlor" horse-car of rather unique construction. It belongs to the bobtail variety in its short body, and being intended to run in one direction only. At the back of the platform there is a compartment capable of seating six or seven persons. The whole car seats 22. It is entirely inclosed. The small compartment is the smoking-room. The roof extends clear over the back platform. Edwin Chesterman is the inventor. There was also shown a street car with a central aisle and cross seats arranged like those of an excursion car, but with blinds and windows arranged to fold up into the roof. The firm also had several very handsome passenger cars on exhibition.

The Chicago City Railway Co.'s exhibit of their cable cars was very complete. Twenty miles of this system of road were built in 1881. A section of the tube for carrying the rope was shown, with rails, car, grip and rope all in position and in working order. The engineer, in looking the exhibit over, could find but one serious defect, and that was in the grip, which is so arranged that in stopping or starting the car there is considerable friction and wear on the rope itself. The wheels, like those of the Chicago cars generally, are protected by a guard coming within a few inches of the surface of the road, intended to prevent people from falling beneath the wheels.

In dining-room cars the most notable was one by the Harlan & Hollingsworth Co., of Wilmington, Del., fitted up in elegant style, and lighted with great brilliancy with 10 lamps in the dining saloon itself. The car is for the Chicago, Milwaukee and St. Paul Railroad. There was also, in addition, a standard parlor car of the same road's exhibit, which has been in use for five years, and looks as bright both inside and out as a new car.

The Pullman Palace Car Co. exhibited a dining-room car fitted up in rather plainer style than the one we have just noticed, but in the matter of upholstery, seats, &c., arranged in an exceedingly neat and comfortable way. The service of plate and chinaware is of an entirely different character from that of the Harlan & Hollingsworth car. Indeed, both of the cars are furnished in a style which makes one long for hotel cars generally in place of the railroad restaurants, with their "five minutes for refreshments."

THE OLD CURIOSITY SHOP.

In the matter of old engines the exhibition was unique. The "No. 1" engine, by Stephenson, built at Newcastle-on-Tyne, was accompanied by what was apparently an original carriage. The wooden brake blocks are worked by a lever similar to those found on our four-wheel coal cars of the present day. The woodwork, though well preserved in the main, shows signs of decay between the boards and at the corners. The engine itself, with its quaint old tender, the tank of which is rusted out near the bottom, was certainly one of the most curious pieces of engineering in the exhibit. There are two vertical cylinders 10 inches in diameter and 24 inches stroke, one over each pair of driving-wheels. A cross-head at the top extends the full width of the engine. A very complicated piece of framework and parallel-motion levers is placed between the cylinders on the top of the boiler for the purpose of keeping the piston-rods in line and working the valves. The wheels are composed of two sections, an outer one and an inner. These two are held together by a series of wooden plugs going through from side to side, with an iron head over most of them. The parallel rod is carried by a return crank on the trailing-wheel on the left-hand side, and on the leading-wheel on the right-hand side. The piping is of cast iron, while the boiler is of wrought iron with a cylindrical shell, and forms the frame of the engine, large brackets being bolted on over each of the driving axles to carry the journal boxes. Both heads have a seam across them, the plates apparently not being large enough to make the whole head. The safety-valve is loaded with a weight. The engineer evidently stood on the left-hand side of the engine to maneuver it, and had two plain hooks connected with the eccentrics. The valves were also controlled by hand levers. The smoke-stack has a quarter turn where it leaves the boiler, which is the most extraordinary piece of plate bending and patching that we ever saw. This engine is remarkable for the fact that there is very little apparent modern patching about it. Many of the other old engines on exhibition show that new parts have been added to replace those which have been destroyed by neglect or hard usage.

One of the most interesting exhibits, which, however, lacks many of the features necessary for its working, was from the Killingworth Colliery—an old engine whose general features are something like those of the Stephenson engine. Its date is 1813. It is without its wheels, and there is little of its running gear left. From what could be seen, however, it appeared to be quite similar in design to the Stephenson engine, though the boiler is considerably more ship-shape, and is covered with a jacket which seems to be of a much later date. The wheels of the tender are on square axles, and the wheels themselves have a large round hole through which the axle goes, and is held fast in place by wooden wedges. The boiler has a single flue, and in this case the rear head, at least, is made of a single sheet, with numerous stay-bolts over the fire-door. There is a small whistle on the engine, and portions of the valve-gear remain. The connecting-rods and all the work by which the wheels were driven have disappeared, together with the running gear, the boiler being about all that is left of the old engine.

To Americans, one of the most interesting things in the grounds in the way of a curiosity was a boiler, which is all that remains of the old "Stourbridge Lion," the first locomotive which was regularly run in this country. It came from the Delaware & Hudson Canal Co., of Carbondale, Pa. There is literally nothing left of the engine but the boiler and the first 12 inches of the smoke-stack. The boiler is made up of three rings, with apparently four sheets in each. An angle iron is bolted on to the end, to make the head fast to, and the head is put in position and bolted fast. The head itself is riveted to a ring which carries the bolts. In this way there are three thicknesses in the flange. The flue or fire-box is 27 inches in diameter, and runs backward for the length of a sheet, where it divides into two flues, ending in a common back connection having a hemispherical end, and from this the gases pass through a short vertical tube into the smoke-stack. The flue is put in by a sort of angle-iron flange, apparently worked out by hand from a single sheet. The flue itself is made from four sheets, and, like all the rest of the work, is single riveted. The iron seems to be about 7/16 inch in thickness in the flue, and nearly ½ in some of the flanged work. There is an oval manhole on the top of the boiler, with a ring, perhaps 2 inches wide, riveted fast inside. Flues inside the boiler are in fair condition, considering their age, although badly fitted *in a few cases. The front head is made by* flanging the sheets inward and putting a convex head upon them. This, it will be remembered, is the boiler of the engine which Horatio Allen ran for the first time at Honesdale, the story of which has been made familiar to almost every mechanical man in the country.

The next engine that attracted the attention of the visitor, though perhaps not in chronological order, was a six-coupled machine with vertical cylinders, built by Timothy Hackworth, New Shildon, Durham, August, 1838. In this case, as in the Stephenson engine, the wheels are made in three pieces, consisting of the tire, outside rim and a center plate. The rim and center plate are connected by round wooden plugs, into which wedges have been driven to hold them fast, and these were originally covered by caps of metal. Most of these caps, however, are missing. The connecting-rods work directly on the forward crank-pins. The piston is kept in line by a parallel motion, in which a horizontal guide is used on one side. The connecting-rods show signs of long and severe service, and the strap ends, though having in general design a modern look, are very rude in construction. The keys are held in place by a most original device. They are split lengthwise parallel with the axis of the rod, and an iron wedge driven up into them makes all fast. Originally the brasses seem to have been partly covered up by a knob of iron screwed on the projecting stud. The outer pins on the middle wheel are spherical, while the inner ones are cylindrical. The end of the connecting-rod is recessed in what seems to be a very modern fashion. The center wheels were originally without flange, but the groove cut by long service is excessive, and now all three wheels might at first sight be supposed to have a flange on both sides. This old engine, the "Samson," was exhibited by the Intercolonial Railway of Canada, and is the property of the Halifax Coal Co., operating the Albion coal mines, Pictou County, Nova Scotia. The engine was in active service on the company's road up to August, 1882. Mr. George Davidson, the "old driver," worked on its construction in England, came to Nova Scotia with it, and drove it until it was laid aside. The company, in their memorandum in regard to it, say: "Both engine and driver are capable of further service." The passenger car which accompanies it looks like a rectangular coach. It was built in Nova Scotia a few years after the engine came there, and is after an English model. It was built for officials, and has carried the Prince of Wales, the Duke of Edinburgh, the Marquis of Normanby, Lord Faulkland, Lord Dufferin and others, besides naval and military officers of high rank. It has been painted and varnished until the coating is too heavy to be of any particular value, since it is spotted, cracked and scaled off in all directions. Like the old engine from the Killingworth Colliery, it has wheels held in place on a square hub by wedges, the axles being octagonal. The same is true of the tender of the "Samson." The engine axles, however, were forged up round. The old coach was upholstered inside very much in the fashion of the plainest kind of stage coaches of its day. During its visit it seems to have had an acci-

dent, and, as the stage drivers say, been "poled," a section of the paneling at the back having been broken out by some means. The sills project before and behind in such a way as to form buffers. A part of this exhibit sat on some of the "fish belly" rails of the early days.

The "John Bull," built in 1831, which a large number of our readers no doubt saw at the Centennial Exposition, was again shown to the public. This engine much more nearly approaches the modern machine in its general features than any we have mentioned. The huge vertical dome at the rear and the horizontal cylinders in the smoke-box were steps looking to the modern machine. Although it has apparently four drivers and a truck, the large wheels are not connected with each other, and the truck, which is hinged to the leading-wheels, is really little more than a cowcatcher, and could have comparatively little effect in guiding the engine. Its valve-gear, however, consists of a series of hooks, and the modern engineer looks in consternation upon such a complicated system of levers, and wonders how it was possible to handle those machines in front of a train, light though they were. In speaking of valve motions we must not omit the exceedingly complicated affair of the Hackworth engine, which, though comparatively modern in execution, is really the most complicated of any we have seen. Time and patience would fail both our readers and ourselves were we to attempt to describe the way in which eccentrics, eccentric-rods, gab-hooks and pins were manipulated to drive the engine and reverse its motion.

That these old engines are still capable of movement certainly seems to the younger generation incredible, and it was curious to watch the expression of the faces of the young men from the shops as they walked around these machines and studied their curious details; relics 3000 years old would scarcely create greater astonishment or arouse more curiosity.

The "Pioneer," C. & N. W. R. R., was built by M. W. Baldwin, June, 1836, for the Utica and Schenectady Railroad, and was afterward bought by the Galena and Chicago Union Railroad. It was said to be the first engine owned by that road, and probably the first used on a Western road. It was in service for 35 years. This engine, with its 11 x 18 cylinders and single drivers, shows that the leading feature of the modern American engine had then assumed definite form. Most of the characteristics to be found in our locomotives are traceable here The single frame forward and double at the rear, and the swiveling track and two eccentrics were also used. The engine was, however, inside connected, and the eccentrics were outside of everything. A pair of V-hooks were used, with a rock-shaft to move the valve-stem. The fire-box was still formed with a hemispherical cross section, and the rear end of the boiler made into a dome. The engine, however, was in such a shape as to be a vast improvement on everything which had gone before it, and, considering the time, was an exceedingly good piece of workmanship. The "Samson," already described, was provided with large iron baskets, which were hung at the forward end, and were used for a very peculiar purpose. The feed pipes project both forward and back of the boiler, and were very much exposed. These baskets were filled with coals and kept the pipes from freezing in cold weather. In contrast to their latest production, the old car exhibited by the Harlan & Hollingsworth Co. was another curiosity in the car line, which, in some respects, is quite as remarkable as that from the Intercolonial Railway. It has a flat roof about 6 feet 5 inches high at the center and 6 feet at the sides. Each seat has a window, which, however, is closed by a sliding wooden panel. Between the seats, coming opposite the seat back, is a glass panel 7½ inches wide by 24 inches long. The general style of the seat, which is in upholstered leather, is surprisingly like those of the present day, the form of the seat arm and seat-iron and the reversing seat-back being all very similar to that in common use. The car is built with a truss plank, and has a "ventilator," consisting of a single 6-inch hole and funnel in the cylinder. There are no panels between the windows, the glass and solid windows being separated only by posts. Apparently there were inside blinds used at one time, but these have all disappeared. The truck has a swing motion through a little 6 inch swing bolster, on which are mounted two rubber springs. There are also rubber springs over each of the journals. The pedestals are somewhat like those now in use, but have no opening through them lengthwise. The car is framed on the cross system, and has two sills. It was built by the Harlan & Hollingsworth Co., for the Tioga Railroad Co., in 1840, and has been in service from that date to the present. The company borrowed it to show the style of first-class passenger cars which they built at that period, and as a contrast to the first-class parlor cars which they had on exhibition.

MACHINE TOOLS, ETC.

The Morgan Engineering Works, of Alliance, Ohio (Eastern house, 22 South Sixth street, Philadelphia, Pa.), had an exhibit showing a large number of tools of unusual and novel design. Their steam hammers present several features that are worth study. Their boring mill for car wheels is fitted up in an exceedingly convenient way, and has, if we are not mistaken, one of the stiffest frames which has yet been introduced for a mill of this kind. It is in the form of a bent cone, which is hollow on one side, and which embraces the chuck or table for perhaps one-quarter of its circumference. In one of the photographs exhibited by the company is shown one of the traveling cranes which Mr. Morgan mentioned in discussion on Mr. Towne's paper at the meeting of the Mechanical Engineers. The photograph shows a very neat machine of great capacity.

In the exhibit of the machine tool works of Frederick B Niles, of Philadelphia, we noticed a tool, sold to R. N. Allen, of Cleveland, which seems to be rather more complete in its way than anything of the kind that has been recently exhibited It is a universal drill, in which the post revolves on the base and the arm revolves on the post. This enables holes to be bored at any angle and in any position relative to the bed of the machine. All the feed motions of the machine are automatic. The post is revolved by a spanner taking hold of a head on a small spur gear. The other motions of the machine are made by cranks in the usual way. The table of this machine is a stationary one, with a horizontal and vertical slot. The bed-plate is prolonged on one side and slotted to receive work. The arm of the tool revolves by worm gear, and is raised and lowered by means of a screw. This machine has bored 137 wheels under favorable circumstances in 10 hours with the aid of one man. It is guaranteed to bore 60 to 80 5-inch holes a day. It has a 6-foot arm, will drill a 6-inch hole and has a radius of 6 feet from the center. The driving gear has eight changes of speed by cones and back gear, and, in addition, is geared up by bevel-wheels. The drill carriage travels upon the traverses upon the arm by rack and pinion. The drill spindle has 21 inches traverse, is counter-weighted and has quick return. The center acts at all angles of the arm. The connection of the counterweight is made by a brass band. The feed gear has six changes, which can be varied while drilling. The drill has a traverse of 4 feet on the arm. Each degree of feed is indicated on the index; will bore a 3-inch hole out of the solid and up to 20 inches. The bed-plate, which is truly planed and slotted, has a central hole to receive bushings for boring. A pit for large and heavy work can be constructed at the side of the machine when it is desirable to do so. The largest sizes have 8½-foot arm. In the larger sizes of the machine the column can be revolved by power, and the drill spindle has its quick return, operated by power and the arm can be raised and lowered by power. The column itself is rectangular in shape, but open in front. The back side from the base to the top is of parabolic form.

The Pratt & Whitney Co., Hartford, had a large number of fine tools on exhibition, among them a 10-inch planer, 3½-foot bed; 20-inch planer, 6-foot bed; 24-inch planer, 6-foot bed; 24-inch planer, 10-foot bed, and a 40-inch planer, 12-foot bed, all of modern construction and extra heavy. The 40-inch planer has a double head and automatic tool-lifting device, and the 30-inch planer also has automatic tool-lifting device. The cross-head is raised and lowered by power for the larger sizes. They also have 14-inch and 10-inch crank shapers with centers, vise and complete automatic feeds, as well as a 10-inch pillar shaper, and lathes from 13 inches to 27 inches swing, all fitted with the firm's attachment for boring and turning taper work, and are back-geared for screw cutting. All the different sizes are fitted with cross-feed except the 15-inch. There were two gap lathes, one a 27-inch and one a 48-inch, having compound tool-rests. In chucking machines for flat drill work, there were two, one a 52 and the other a 28-inch, fitted with quick return for foot blocks and spindle. A No. 3 screw-cutting machine, fitted up for making ½-inch steel set screws, a No. 2 screwing and shaving machine for finishing the heads, and No. 1 and No. 2 three-power milling machines were shown, the former having elevating centers, vise and arm complete. There were several sizes of hand lathes and cutting-off machines, and two sizes of upright drills with worm and hand-wheel feed, and an upright drill, back geared, with automatic feed and quick return for drilling index-wheels; five-spindle nut-tapping machine for tapping five 1-inch nuts at once; No. 3 and 4 turret-head bolt cutters, cutter grinder, with all attachments for grinding spirals strait and taper reamers, millers or cutters. A bolt-heading machine for blacksmith and forge work was also shown, and a "Champion" drill for manufacturing purposes with lever feed. This is a very convenient drill tool. There was also shown a complete list line of United States standard taps, dies and die stocks, hand and machine taps, from ¼ up to 3½ inches in diameter, together with taper reamers for locomotive work; cylindrical size gauges from ⅛ to 2 inches by 16ths and 2⅛ to 3 inches by 8ths; full sets of United States standard threading guages from ¼ inch to 2 inches, hardened and not ground and hardened and ground, and a set of rough iron guages of the car builders' standard. They also had "limit" guages for round iron drop, forged for the Master Car Builders' standard as suggested by the late Howard Fry. This gives the least allowable variation which rolling mills can work to without increasing the cost of rolling the iron and producing United States standard threads when cut in any bolt cutter. Also drop forged gauges for shop work. End measures were also shown hardened and ground. All tools on exhibition were in operation with one or two exceptions.

There was one article on exhibition which, though very familiar to all our Eastern readers, both from descriptions and by practical use, seems to have struck many of our Western friends as a decided novelty. This was the Stow flexible shaft and its numerous applications. The shaft itself, since its first appearance half a dozen years ago, has been greatly improved, and its cost, durability, &c., are now put on a par with other drilling tools. The shaft exhibited at the exposition was driving a 2-inch drill through a rawhide rope, 130 feet in length, carried over six idlers to reach the point where the drill was in use. In many of the Western shops, where large machinery is built with comparatively small tools, this shaft ought to be more useful and popular even than it is East. Its ability to turn corners, to do work in cramped situations and to be generally indifferent to the sharpest angles, are recommendations which machinists will be quick to see.

W. D. Wood & Co., McKeesport, Pa., had an exhibit of planished iron which, so far as an outsider could judge, was quite as handsome as any genuine Russia iron in the market. Pipes, collars, elbows and a small boiler casing were shown.

Geo. H. Thatcher & Co., Albany, N. Y., had a fine exhibit of car wheels. One of these had required 300 blows of a 20-pound sledge in order to punch from the web two 4-inch holes. Corrugated Dorsch patent single-plate cast-iron car wheels are made exclusively by this firm.

The Allen Paper Car Wheel Co. had an exhibit showing the paper car wheel in all stages of manufacture, from the loose sheets of cardboard, steel tires and plain plates of

iron to the completed wheel ready for service on the road. They had samples of all sizes of finished wheels, from 26 to 42 inches in diameter, as well as finished wheels which had been cut in sections to show the construction

Geo. D. Walcott & Son, Jackson, Mich., showed a shaping machine in which several very desirable improvements have been made, notably in the way of increasing the width of the slides, by which the leverage of the tool is diminished and the stiffness increased. An increase has also been made in the length of the vertical slides, which greatly diminishes the leverage.

The Vulcan Iron Works, of Chicago, showed a very neat machine for pile driving, operated in the same way as a steam hammer, but set in guides like an ordinary hammer head. It is arranged so as to have steam connection from a boiler carried to the cylinder by a flexible hose. A tackle from the top of the machine is used for raising or lowering it. Its operation is very rapid, the blows coming much quicker than is possible when using an ordinary drop, and herein the advantage of the apparatus is apparent. Although it is necessary to have a steam engine to hoist piles and put them in position, yet the slowness of the drop makes it desirable to use some other means than a hoisting engine for striking the blow. By adjusting the relief valve a heavy blow up to the full capacity can be struck regularly and continuously. By proper management of this valve any kind of pile can be used, hard or soft, and driven to any depth without injuring the pile head. Five-ply steam hose is used to carry steam to the hammer. It is said that as many as 100 piles have been driven in a single day with this apparatus.

Wilbraham Bros., of Philadelphia, had an exhibit of very considerable interest, especially to contractors and others who have large quantities of water to handle. It was a pump with engine attached which is capable of delivering 50,000 gallons of water per hour. The small space which it occupies and its comparatively light weight make it a very valuable machine in those situations where large quantities of water have to be contended with—as in making excavations, draining quarries, irrigating and other similar work.

RAWHIDE BELTS.

The Chicago Rawhide Mfg. Co. are manufacturing rawhide belts from the widest that may be necessary down to the narrowest. In the Exposition Building there were a great number of belts running, the widest of which was 26 inches, and taking power from the engine which drove the Brush lights in the building. This belt has been in use for three years, and is apparently in first-class condition at the present time. In addition to flat belts, the company are making a line of rawhide ropes twisted in the same manner as a hemp rope. The larger ropes—that is, above the smallest size of twisted rope—are ¾, and they are made up to any diameter that may be desired. Below that the round ropes are made in the same manner as round and leather belting, being a single strand or thong of leather twisted up into circular shape. These are made down to ¾ inch in diameter. Lace leather is also made by the same process in all widths and lengths. The sides measure from 8 to 24 feet, and are of all grades of thickness. The entire freedom from hard spots is one of the points which the manufacturers urge as a great advantage of their product. The leather is cured under Krueger's patent, and retains its life and strength in a remarkable manner. It is not tanned, and closely resembles ordinary rawhide. Moisture seems to have very little effect upon it after being cured in this way. Some of those who have used the belts make extraordinary statements in regard to the running of the belts in damp situations and places that are exposed to both heat and damp at the same time. From these statements we suppose that the belts are exceedingly indifferent to either heat or moisture. It would seem that these ropes ought to make the very best driving gear for electric lights and other machinery where a considerable power must be transmitted with the least possible slip. In the exposition a very long line of round belting was running driving a flexible shaft. The rope ran over six idlers, and was at least 130 feet in length, and showed, after four weeks' running, no perceptible signs of wear. The rope is quite as flexible as the softest rope made. Indeed, 1¼-inch rope bends much more readily than the best hemp. For round rope the hide is cut in a circle, and the company get about 800 feet of ¼-inch belting from an ordinary hide.

WOOD-DRYING APPARATUS.

The Noyes patent wood-drying apparatus on exhibition produced some of the most remarkable results which can be imagined in the treatment of wood. One of the most striking exhibits was a ½-inch mahogany board, 21 inches wide and 18 or 20 feet long, which had been dried in about six or eight hours, and was as straight and free from wind as possible. A similar board from the same log of the same size and thickness put through a dry house was warped and sprung in all directions, though about as fair as a board of its size and thickness is usually found. Gum, cypress, spruce and several other Western woods which warp badly were on exhibition perfectly dry, smooth and straight. Even wood that had dried naturally and curled into an angle of 90° in a length of 6 feet had been straightened and laid flat. The general principle of the process is to lay the boards between plates kept at a high heat by coils of steam pipes passing through them, and then subject the whole pile to hydraulic pressure of about two tons per square foot. The moisture is converted into steam and escapes from the pile, while the pressure holds the wood flat and prevents warping.

WIRE ROPE, SHOVELS, CAST STEEL.

Geo. B. Carpenter & Co., of Chicago, had an exhibit of wire rope, cables and flat wire rope of all sizes and descriptions. Mr. Carpenter had a representative exhibit of John A. Roebling & Sons wire rope. Among other interesting features of the exhibit were sections of the East River Bridge cables, the Covington and Cincinnati Bridge cables and the Niagara Falls cables. Both steel and iron wire were shown in great variety. Large wires are in quarter and the smaller in half mile bundles.

Hussey, Binns & Co., Pittsburgh, had a display of shovels made by their patent process which show an extraordinary strength and quality. The blanks are cast in a mold, which leaves the shank split with the blank 3 inches at the point by 4 at the top, about 4 inches long and one 1 inch thick. This blank does not require any welding, and is forged down to proper shape in the usual manner. The same form of blank is used for railroad scoops and for a variety of similar work. A casting in a solid piece of steel good enough to take a cutting edge obviates the necessity for welding the pieces upon the lip of the shovel. The tests of these goods show that they have an extraordinary strength and stiffness.

Hussey, Howe & Co., Pittsburgh, in the same pavilion, had an exhibit of crucible tool steel of all sizes and shapes. They also had some very interesting and difficult samples of flanging on crucible steel plates, and a number of plates of open-hearth steel exhibiting very difficult flanging work.

OLD DRAWINGS AND PHOTOGRAPHS.

One of the most interesting portions of the exhibit relating to the early history of locomotives was a collection of old drawings. These embraced most of the early engines which were run on the roads of this country, and included the "Best Friend," "West Point," "Experiment," and many others whose names are not so well known. Many of these drawings are recent sketches by David Matthews, of San Francisco, and others are originals or copies made in early days from the original drawings of these engines. The "Robert Fulton," for example, a four-wheel engine with four drivers, from the date seems to have been made about 1852. Several of them, however, are made from the original engines when they first came out, notably one of the "West Point," showing the first cover or cab which was put on. This was apparently built with a curtain in front. There was a sketch of a double bow-gate or double-truck engine called the "Horatio Allen," built in 1831 or 1832 at the West Point Foundry shops, New York. One of the most remarkable, if not the oldest, engines is the "Essex," which was shown in a drawing copied from one made by her first engineer, Cyrus R. Woolson. Like all of Boyden's work, it shows remarkably good engineering and mechanical ability. The valve motion is most peculiar, and, for the time, showed remarkable simplicity. The engine had a truck and a single driver, with a tender whose tank approximated the modern fashion.

There was a photograph of an exceedingly interesting drawing which showed the earliest form of equalizing lever which we have seen. The drawing is dated 1832, and the truck is equalized with the forward driver by a lever carried above the frame. There was also a photograph from a drawing of the first eight-wheel Rogers machine. Mr. Matthews showed an old drawing made in 1835 of a Baltimore and Ohio engine, which was made from measurements in order to compare and decide on engines for the Utica and Schenectady Railway. The engines which were measured were the "Washington" and "Franklin," then running on the Baltimore and Ohio Railroad. These engines were of the grasshopper type, and were geared. The gearing drove a crank-shaft, which by coupling-rods took hold of outside cranks on each of the driving axles, and were similar to the "Arabian" on exhibition. Mr. Matthews also sent a drawing of a Baldwin engine on the Utica and Schenectady Railroad in 1836. This gives an elevation and plan of the engine, and was made in 1835. A radiating car by Matthews and a painting representing the first train of eight-wheel passenger coaches running west of the Hudson River were also among the curious features of the exhibit. This train shows a series of cars not unlike that built by Harlan & Hollingsworth in 1840. The tender of the engine is shown accompanied by a wood car. The coaches were built by Davenport & Bridges. Mail and other cars were under the supervision of Hiram Wiser, superintendent of the Rochester and Auburn division of the New York Central Railroad. The train was put on the track at Rochester in 1842. The painting was made in 1843 by Chas. Hyam, assistant engineer on the line, and is exhibited by I. Van Kuran, Omaha, Neb. There was also shown a drawing of a six-wheel engine called the "T. Perkins," built in 1849 for the Baltimore and Ohio Railroad. This engine had a water space all around the smoke-box. The English photographs of locomotives are well worth the study of American photographers and those who wish to have photographs of their engines taken. Although not as pleasing in some respects as American photographs of similar subjects, the treatment of the sky, and the fact that the engines appear to have received a coat of paint suitable to photograph well is worthy of notice.

The series of water colors exhibited by the Manchester, Sheffield and Lincolnshire Railway is of more than usual interest. They are 14 in number and represent various parts of the line, the more important structures on it, and the different styles of coaches used at the time of the opening. These give a better idea of how the early railways looked than anything we had previously seen. They are divested of the old look which modern art is always contriving to put upon its representations of the ancient work in its prime. The fact seems to be forgotten that when first built these old railways must have had as spick and spandy a look as those at the present time, though to the modern eye presenting many quaint features. Stephenson's portrait is a beautiful sample of the old miniature work, and preserves its tints apparently as fresh as on the day it was painted.

The business and financial management of the exhibition does not appear from the reports of exhibitors to have been happy in all respects. This probably results from the magnitude of the work, which has greatly exceeded the expectations of the managers. Whether this was unavoidable we do not know. Indeed, we have hardly heard definite form given to the complaints, but, as stated in the early portion of this report, there cannot be the slightest doubt as to the value of this unique exhibition to both visitor and manufacturer.

Awards at the Railway Exhibition.

We give below the official list of awards of premiums to exhibitors at the Railway Exhibition:

DEPARTMENT A—ROLLING STOCK.

Class No. 1.—Locomotives.

Best display of locomotives, grand gold medal, Brooks Locomotive Works.

Best narrow-gauge passenger, gold medal, Brooks Locomotive Works.

Best standard-gauge freight, gold medal, Baldwin Locomotive Works.

Best narrow-gauge freight, gold medal, Baldwin Locomotive Works.

Best switching, gold medal, Brooks Locomotive Works.

Best logging and mining, gold medal, H. K. Porter.

Best locomotive involving important new principles, gold medal, Philadelphia and Reading Railroad Co.

Best locomotive clock, bronze medal, Crosby Steam Gauge and Valve Co.

Best steam-gauge cock, bronze medal, James B. Clow & Son.

Best stop-cock, bronze medal, James B. Clow & Son.

Best locomotive headlight (to burn oil), gold medal, Headlight Signal Co.

Best steam gauge, silver medal, Ashcroft Mfg. Co.

Best water gauge, bronze medal, James B. Clow & Son.

Best gauge test pump, bronze medal, James P. Marsh & Son.

Best grate bar, silver medal, Lemuel Bannister.

Best locomotive bell, silver medal, James B. Clow & Son.

Best locomotive oiler, bronze medal, A. W. Swift.

Best wire cloth, bronze medal, Clinton Wire Cloth Co.

Best locomotive safety-valve, silver medal, D. E. Pierce & Co.

Best steam muffler, silver medal, Crosby Steam Gauge and Valve Co.

Best steam whistle, silver medal, Jas. B. Clow & Son.

Best filterer for water for locomotive, bronze medal, Farquhar-Oldham Filter Co.

Best boiler rivets, bronze medal, Hoopes & Townsend.

Best elevated railway system, gold medal, Richard P. Morgan.

Best sand dryer, silver medal, Johnson & Hartwell.

Best locomotive steel forgings, gold medal, Midvale Steel Co.

Best locomotive ash-pan, bronze medal, W. H. D. Newth.

Best pop-valve, silver medal, Consolidated Safety Valve Co.

Best piston packing expander, bronze medal, Winona Machinery Co.

Best ratchet drill attachment, bronze medal, J. A. Wilson.

Best locomotive and car iron forgings, silver medal, Wilson, Walker & Co.

Best automatic oiler, bronze medal, Yost Car Axle Lubricator Co.

Best locomotive feed door, bronze medal, Putnam Furnace Co.

Best boiler cleaner, bronze medal, J. F. Hotchkiss.

Best pressure gauge, silver medal, Yale & Towne Mfg. Co.

Best time, speed and pressure recording alarm and gauge, bronze medal, Edson Recording Alarm Gauge Co.

Class No. 2.—Cars.

Best display of cars, gold medal Pullman Palace Car Co.

Best private or officer's, gold medal, *Railway Age.*

Best dining, gold medal, Pullman Palace Car Co.

Best sleeping, gold medal, Pullman Palace Car Co.

Best day, gold medal, Jackson-Sharp Co.

Best mail, gold medal, Harrison Bag-Rack Co.

Best baggage, silver medal, Pullman Palace Car Co.

Best stock, gold medal, New York Live Stock Express Co.

Best box, silver medal, St. Charles Car Co.

Best flat or gondola, silver medal, United States Tube Rolling Stock Co.

Best coal, ore or gravel dump, silver medal, United States Car Co.

Best wrecking, silver medal, Bucyrus Foundry and Machine Co.

Best road or section master's, silver medal, Fairbanks, Morse & Co.

Best hand, silver medal, Fairbanks, Morse & Co.

Best velocipede, silver medal, T. B. Jeffrey.

Best tank car, silver medal, Chester Oil Co.

Best caboose car, silver medal, Lafayette Car Co.

Best smoking-car, silver medal, Pullman Palace Car Co.

Class No. 3.—Running Gear.

Best steel axle (Master Car Builders' standard), silver medal, Midvale Steel Co.

Best iron axle (Master Car Builders' standard), silver medal, Pittsburgh Forge and Iron Co.

Best passenger train brake, gold medal, Westinghouse Air Brake Co.

Best brake shoe, silver medal Congdon Brake Shoe Co.

Best springs (elliptic), gold medal, A. French & Co.

Best springs (bearing), silver medal, A. French & Co.

Best springs (buffer or draw), bronze medal, French Spiral Spring Co.

Best equalizing spring, silver medal Cliff & Righter.

Best draw-bar for freight car, silver medal, Continuous Draw-Bar Co.

Best journal-box lid, silver medal, W. J. Watson.

Best journal bearing, silver medal, D. A. Hopkins.

Best steel-tire for car-wheels, gold medal, Midvale Steel Co.

Best steel-tire combination wheel, gold medal, Allen Paper Car-Wheel Co.

Best car-step, bronze medal, Thomas B. Howe.

Best passenger car platform, coupler and buffer, gold medal, McConway, Torley & Co.

Best passenger car six-wheel truck, gold medal, Suspension Car-Truck Co.

Best automatic freight-car coupler, silver medal, McConway, Torley & Co.

Best display of car-wheels, gold medal, Allen Paper Car-Wheel Co.

Best electric magnetic brake, gold medal, Waldumer Electric Magnetic Brake Co.

Best transfer table, silver medal, N. W. Robinson.

Class No. 4.—Interior Furnishings for Passenger Cars.

Best display, gold medal, Post & Co.

Best car-door lock, bronze medal, Post & Co

Best seat end, silver medal, Hale & Kilburn.

Best seat-end lock, bronze medal, S. A. Smith.

Best seat-end fixtures, bronze medal, Gardner & Co.

Best curtain goods, silver medal, F. W. Devoe & Co.

Best curtain roller, bronze medal, Samuel Lacock & Son.

Best head lining (wood), silver medal, Hale & Kilburn.

Best window blind, bronze medal, I. G. Wilson.

Best seat frame, silver medal, Hale & Kilburn.

Best upholstering, silver medal, Hale & Kilburn.

Best display fancy woods and veneers, gold medal, the E. D. Albro Co.

Best berth and seat springs, silver medal, E. L. Bushnell.

Best wash-room pump, silver medal, J. B. Clow & Son.

Best cooking range, silver medal, Stephen Wilkes.

Best reclining chair, silver medal, Marks Adjustable Folding Chair Co.

Best revolving chair, silver medal, Marks Adjustable Folding Chair Co.

Best washstand for parlor or sleeping car, complete, silver medal, Hale & Kilburn.

Best basket rack, silver medal, Post & Co.

Best door-holder, bronze medal, Pullman Door Check Co.

Best door-knob, bronze medal, Yale & Towne Mfg. Co.

Best cuspidor or spittoon, bronze medal, Eureka Iron Co.

Best head-board fixtures for sleeping car, bronze medal, Post & Co.

Best folding bed for car, complete, silver medal, Hale & Kilburn.

Best electric or other call bell, bronze medal, Western Electric Co.

Best window ventilator, bronze medal, H. H. Reynolds.

Best car seat, complete, silver medal, Hale & Kilburn.

Best display of metal trimmings, gold medal, Union Brass Co.

Best display of glass veneers, silver medal, Glass Veneer Co.

Best method of lighting cars, gold medal, J. M. Foster.

Best system of closet ventilation, silver medal, E. Y. Bell.

Best elevated gravity and mining railway, gold medal, Chicago Elevated Railway Co.

Class No. 5.—Freight Car Appliances.

Best car seal, bronze medal, E. J. Brooks.

Best car replacer, silver medal, M. S. Shotwell.

Best car pusher, bronze medal, C. T. Barnes.

Best grain-car door, silver medal, D. F. Van Liew.

Best freight-car door, silver medal, E. E. Pratt.

Best end-door inside fastener, bronze medal, W. J. Watson.

Best freight-car lock, bronze medal, Yale & Towne Mfg. Co.

Best door-hanger, bronze medal, S. H. & E. Y. Moore.

Best metal roofing, silver medal, Empire Car Roofing Co.

DEPARTMENT B—MACHINERY.

Class No. 1.—Wood-Working.

Best display of wood-working machinery (not less than six machines), grand gold medal, J. A. Fay & Co.

Best planing and matching machine, to plane 24 inches wide and under, and not match less than 12 inches, gold medal, Goodell & Waters.

Best flooring and beading machine, gold medal, J. A. Fay & Co.

Best dimension planing machine, with carriage and roll feed for dressing out of wind and surfacing, silver medal, J. A. Fay & Co.

Best Daniels or Traverse planing machine, silver medal, J. A. Fay & Co.

Best double surfacing machine to dress on one or both sides, 26 inches wide and 6 inches thick and under, gold medal, J. A. Fay & Co.

Best surfacing machine for smoothing purposes, gold medal, J. A. Fay & Co.

Best band-saw machine for general work, silver medal, Goodell & Waters.

Best band saw for resawing, to resaw 24 inches wide and under, silver medal, J. A. Fay & Co.

Best railway cutting-off saw machine, with traversing arbor for timbers, silver medal, J. A. Fay & Co.

Best ripping saw with elevating arbor, silver medal, J. A. Fay & Co.

Best one-spindle horizontal boring machine, silver medal, J. A. Fay & Co.

Best three-spindle horizontal boring machine, silver medal, J. A. Fay & Co.

Best radial horizontal boring machine, silver medal, J. A. Fay & Co.

Best three-spindle vertical boring machine, silver medal, J. A. Fay & Co.

Best automatic car gaining machine, silver medal, J. A. Fay & Co.

Best vertical car tenoning machine, silver medal, J. A. Fay & Co.

Best universal tenoning machine, with movable carriage for timber work, silver medal, J. A. Fay & Co.

Best tenoning machine, with copes for cabinet and general work, silver medal, J. A. Fay & Co.

Best vertical spindle shaping and edge molding machine, silver medal, J. A. Fay & Co.

Best universal wood-worker and molder, silver medal, J. A. Fay & Co.

Best straight molding machine to work four sides, silver medal, J. A. Fay & Co.

Best surface polishing machine, silver medal, J. A. Fay & Co.

Best automatic knife-grinding machine and saw-sharpener, silver medal, Herbold & Bush.

Best wood-turning machine for pattern-makers' use, silver medal, J. A. Fay & Co.

Best reciprocating and mortising machine, silver medal, J. A. Fay & Co.

Best timber-dressing machine, with capacity of reducing 16 inches or over, and 12 inches thick and over, silver medal, J. A. Fay & Co.

Best circular resawing machine, silver medal, Goodell & Waters.

Best hollow chisel mortising machine, silver medal, Greenlee Bros.

Best self-feeding rip saw, bronze medal, Greenlee Bros.

Best automatic saw sharpener, silver medal, Halliday, Litchfield & Co.

Best lumber dryer, silver medal, H. I. Kimble.

Best flexible shafting, bronze medal, Stow Flexible Shaft Co.

Class No. 2.—Iron-Working.

Best display of iron-working tools (power), not less than six in number, grand gold medal, Pratt & Whitney Mfg. Co.

Best axle-turning machinery, silver medal, Machine Tool Works.

Best car-wheel boring and turning machine, gold medal, Machine Tool Works.

Best six-spindle drilling machine, silver medal, Niles Tool Works.

Best hydraulic wheel press, silver medal, Machine Tool Works.

Best wheel-grinding or trueing machine, silver medal, Chilled Car-Wheel Grinding Co.

Best iron-planing machine, silver medal, Machine Tool Works.

Best iron crank shaping machine, silver medal, Pratt & Whitney Mfg. Co.

Best screw-cutting engine lathe, silver medal, William Sellers & Co.

Best upright drilling machine, silver medal, William Sellers & Co.

Best radial drilling machine, silver medal, Machine Tool Works.

Best bolt-heading machine, silver medal, National Machinery Co.

Best bolt-forging machine, silver medal, National Machinery Co.

Best bolt and screw cutting machine, silver medal, National Machinery Co.

Best set-screw machine, silver medal, Pratt & Whitney Mfg. Co.

Best power hammer, silver medal, Machine Tool Works.

Best power punch and shears, silver medal, Hercules Iron Works.

Best planer chuck, silver medal, Pratt & Whitney Mfg. Co.

Best universal and independent chuck, over 12 inches in diameter, silver medal, E. Horton & Son.

Best universal lathe chuck, 12 inches and under, silver medal, E. Horton & Son.

Best assortment of lathe chucks, silver medal, E. Horton & Son.

Best assortment of planer chucks, silver medal, E. Horton & Son.

Best display of emery-grinding machinery, silver medal, Northampton Emery Wheel Co.

Best display of machinists' vises, silver medal, Fisher & Norris.

Best display of taps and dies, silver medal, Pratt & Whitney Mfg. Co.

Best nut-tapping machine, silver medal, Shumway, Burgess & Co.

Best drill grinding machine, silver medal, William Sellers & Co.

Best slotting machine, silver medal, Machine Tool Works.

Best driving-wheel lathe, gold medal, Wm. Sellers & Co.

Best shafting, gold medal, Jones & Laughlins.

Best hanger, bronze medal, Jones & Laughlins.

Best pulley, bronze medal, Jones & Laughlins.

Best flue-welding device, bronze medal, Hartz & Fix.

Best portable power drill, bronze medal, Thomas H. Dallett & Co.

Best spring tester, silver medal, Tinius Olsen & Co.

Best die for forging car axles, silver medal, Boston Forge Co.

Best display of tools for repairing locomotives, silver medal, Flanders Machine Works.

Best hot-air pumping engine, silver medal, C. H. Delamater & Co.

Best machine for testing strength of metals, gold medal, Fairbanks, Morse & Co.

Best vertical boring mill, silver medal, Wm. Sellers & Co.

Best horizontal boring machine, silver medal, Wm. Sellers & Co.

DEPARTMENT C—TRACK GOODS.

Class No. 1.

Best display of steel and iron rails and track goods, grand gold medal, Cambria Iron Co.

Best track-laying device, gold medal, American Railway Construction Co.

Best track bolt and nut, bronze medal, Hoopes & Townsend.

Best track-bolt washer, bronze medal, Pratt Mfg. Co.

Best railway fencing, silver medal, Western Fence Co.

Best claw bar, bronze medal, Crerar, Adams & Co.

Best cross-tie (metal), silver medal, D. S. Whittenhall.

Best process for preserving wood cross-ties and timber, gold medal, Wood Preserving Co., St. Louis.

Best crossing, silver medal, Morden Frog and Crossing Co.

Best fish and angle plate, silver medal, Morris, Sellers & Co.

Best track jack, Jenny jack, bronze medal, Pettibone & Mulliken, agents.

Best jack screw, bronze medal, Crerar, Adams & Co.

Best track level, bronze medal, Crerar, Adams & Co.

Best nut lock, silver medal, Van Kuren Elastic Nut Lock Co.

Best scraper, silver medal, L. Pennock & Sons Co.

Best track gauge, bronze medal, Crerar, Adams & Co.

Best shovel, bronze medal, Hussey, Binns & Co.

Best spikes (one keg), bronze medal, W. Goldie.

Best switch (complete), silver medal, Gray Switch Co.

Best switch lock, bronze medal, Post & Co.

Best switch stand, bronze medal, Fairbanks & Co.

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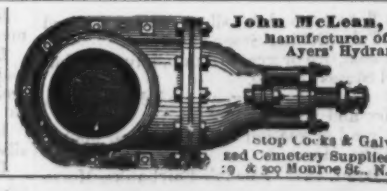

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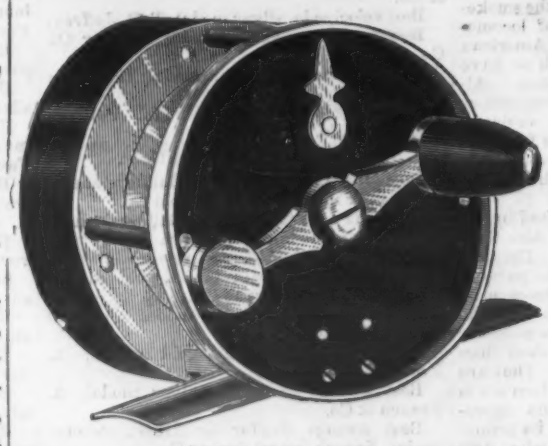

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Best ballast unloader, silver medal, Bucyrus Foundry and Machine Co.

Best track-laying car, silver medal, Bucyrus Foundry and Machine Co.

Best yard switch, silver medal, H. & H. Elliott.

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Best brace or head chair for switches, bronze medal, Wier Frog Co.

Best Radway plow, bronze medal, Kilbourne & Jacobs Mfg. Co.

Best snow plow, gold medal, Hawley Steam Snow Excavator Co.

Best crane, gold medal, Industrial Works, Bay City, Mich.

Best derrick, silver medal, Yale & Towne Mfg. Co.

Best car truck shifting apparatus, silver medal, R. H. Ramsey, Philadelphia.

Best culvert pipe, silver medal, Blackmer & Post, St. Louis.

Best automatic danger signal, silver medal, Thomas H. Gibbons.

DEPARTMENT D—METALS.

Best car-wheel iron, gold medal, Barnum, Richardson & Co.

Best flanging iron, silver medal, Eureka Iron Co.

Best boiler plate (iron), silver medal, Eureka Iron Co.

Best display iron ores, gold medal, Barnum, Richardson & Co.

DEPARTMENT E—CLASS NO. I.

Station and Office Appurtenances.

Best baggage barrow, Penfield Block Co., bronze medal.

Best baggage check, W. W. Wilcox, silver medal.

Best engraved folder, Rand, McNally & Co., silver medal.

Best display of general office printing, Rand, McNally & Co., silver medal.

Best dating stamp, bronze medal, B. B. Hill Mfg. Co.

Best canceling stamp, bronze medal, B. B. Hill Mfg. Co.

Best system of passenger tickets, silver medal, Rand, McNally & Co.

Best desk for railway offices, silver medal, A. H. Andrews & Co.

Pumps and Water Station Appliances.

Best steam pump for water station, gold medal, Fairbanks, Morse & Co.

Best hand pump for water station, bronze medal, Fairbanks, Morse & Co.

Best platform scale, Fairbanks, Morse & Co., silver medal.

Best track scale, Fairbanks, Morse & Co., gold medal.

Best hydraulic ram, bronze medal, J. B. Clow & Son.

Best water tank, silver medal, United States Wind Engine and Pump Co.

Best water-tank fixtures, silver medal, J. N. Poage.

Best windmill for water stations, silver medal, Fairbanks, Morse & Co.

Other.

Best freight or warehouse truck, bronze medal, Fairbanks, Morse & Co.

Best silver service for private car, silver medal, *Railway Age* Publishing Co.

Best letter-file, bronze medal, Cameron, Amburg & Co.

Best money-bag for transporting specie and currency, bronze medal, W. H. Sanford.

Best safety plate for frogs, bronze medal, Black & English.

Best type-writer, silver medal, E. Remington & Sons.

Best telegraph and telephone wire, silver medal, Roebling Sons Co.

Best ticket case, silver medal, L. J. Blades.

Best letter press, bronze medal, Fairbanks, Morse & Co.

Best display of registering devices, bronze medal, Beadle & Courtney.

Best baggage-check holder, bronze medal, T. Abbott.

Best ticket holder, bronze medal, W. B. Van Amringe.

Best watch-case for railway use, silver medal, Hagstoz & Thorpe.

Best anti-dust and water-proof watch-case for railway use, silver medal, Giles Brothers Mfg. Co.

Best conductor's and engineer's watch, silver medal, Giles Brothers Mfg. Co.

Best tower-clock movement for depot, silver medal, Giles Brothers Mfg. Co.

Best anti-magnetic shield for watches, bronze medal, Giles Brothers Mfg. Co.

Best portable chronometers, silver medal, Giles Brothers Mfg. Co.

Best station indicator and clock combined, bronze medal, J. C. McKenzie.

Best station train directory, silver medal, Wheeler & Wilson Mfg. Co.

Best station indicator for trains, bronze medal, Wheeler & Wilson Mfg. Co.

DEPARTMENT G.

Oils, Varnishes and Paints.

Best display of passenger-car body colors, including samples of work, gold medal, F. W. Devoe & Co.

Best display of freight-car body paints, including samples of work, silver medal, Carey, Ogden & Parker.

Best display of wood-filler, including samples of work, silver medal, Bridgeport Wood Finishing Co.

Best lard oil, F. S. Pease, silver medal.

Best lubricating oil (passenger car), F. S. Pease, silver medal.

Best lubricating oil (freight car), F. S. Pease, silver medal.

Best headlight oil, 175° fire test, F. S. Pease, silver medal.

Best lamp oil, 300° fire test, silver medal, F. S. Pease.

Best valve oil, F. S. Pease, silver medal.

Best car grease, F. S. Pease, bronze medal.

Best oil tank with pump, F. C. Wilson & Co., bronze medal.

Best display of paint brushes, F. W. Devoe, silver medal.

Best surfaces, Murphy & Co., silver medal.

Best lamp and flag holder, F. W. Coolbaugh, bronze medal.

DEPARTMENT H.—MISCELLANEOUS.

Best rubber belting, silver medal, Hamilton Rubber Co.

Best conductors' ticket punch, silver medal, L. O. Crocker.

Best rubber hose, bronze medal, Hamilton Rubber Co.

Best brake hose, bronze medal, Hamilton Rubber Co.

Best track signal (torpedo), bronze medal, F. Munn; Pettibone & Mulliken, agents.

Best surveyors' transit, silver medal, Wm. Jordan & Son.

Best surveyors' field glass, bronze medal, L. Manasse.

Best display of surveyors' instruments, gold medal, Keuffel & Esser.

Best variety of engineers' drawing tools, bronze medal, L. Manasse.

Best engineers' level, bronze medal, W. Jordan & Son.

Best engineers' barometer, bronze medal, L. Manasse.

Best set engineers' railway curves, bronze medal, Keuffel & Esser.

Best leveling rod, bronze medal, Keuffel & Esser.

Best prismatic compass, bronze medal, L. Manasse.

Best train badge, bronze medal, W. W. Wilcox.

Best time detector, bronze medal, E. Imhouser.

Best electric signaling device for block or other signals, gold medal, Union Switch and Signal Co.

Best semaphore, silver medal, Union Switch and Signal Co.

Best semaphore lens, silver medal, Corning Glass Mfg. Co., Adams & Westlake Mfg. Co.

Best time detector, electric clock and register, silver medal, Western Electric Co.

Best file, "cast iron," silver medal, M. A. Howell.

Best fire-proof insulating, bronze medal, Chicago Insulating Co.

Best electric motor for stationary purposes, gold medal, United States Electric Light Co.

Best electric railway system, gold medal, Electric Railway Co. of United States.

Best drawing table, bronze medal, Keuffel & Esser.

Best dynagraph and track inspection car, gold medal, P. H. Dudley.

Best depot signal, silver medal, Union Switch and Signal Co.

Best key relay and sounder complete, silver medal, Western Electric Co.

Best display telegraph instruments and supplies, silver medal, Western Electric Co.

Best stop signal-lamp, bronze medal, Underhill, Osborne & Co.

Best display signal-lamp, silver medal, Underhill, Osborne & Co.

Best locomotive signal-lamp, bronze medal, Underhill, Osborne & Co.

Best railway surgical dressings, bronze medal, Seabury & Johnson.

DEPARTMENT I.

Street Railway Appliances.

Best iron wheel, silver medal, Baltimore Car Wheel Co.

Best car, gold medal, J. G. Brill & Co.

Best car spring, silver medal, French Spiral Spring Co.

Best draw spring, bronze medal, French Spiral Spring Co.

Best bell cord and fixtures complete, bronze medal, John Stephenson Co., Limited.

Best fare box, silver medal, J. B. Slawson.

Best end lamp, bronze medal, John Stephenson Co., Limited.

Best hand-rail bracket, bronze medal, John Stephenson Co., Limited.

Best journal bearing, bronze medal, John Stepenson Co., Limited.

Best door locks, bronze medal, John Stephenson Co., Limited.

Best registering punch, bronze medal, Beadle & Courtney.

Best sheave for sliding door, bronze medal, John Stephenson Co., Limited.

Best door handle, bronze medal, John Stephenson Co., Limited.

Best life guard, silver medal, John Stephenson Co., Limited.

Best street-car truck, silver medal, Suspension Car Truck Co.

Best street-car switch, bronze medal, A. L. Johnson.

Best street-car turn-table, silver medal, Wm. Wharton, Jr., & Co.

Best street-car crossing, silver medal, Wm. Wharton, Jr., & Co.

Best stationary registering device, silver medal, Lewis & Fowler.

Best street-car axle-box, silver medal, John Stephenson Co., Limited.

Best portable registering device, bronze medal, E. Chesterman.

Best ventilated ceiling, silver medal, John Stephenson Co., Limited.

UNCLASSIFIED.

Best tube-welding machine, bronze medal, Manning, Maxwell & Moore.

Best cupola, silver medal, Colliau Furnace Co.

Best malleable iron castings, bronze medal, Cleveland Malleable Iron Co.

Best fire hose, bronze medal, Eureka Fire Hose Co.

Best fire-clay brick, bronze medal, Denver Fire Brick Co.

Best power blower, silver medal, Boston Blower Co.

Best power-pressure blower, silver medal, Wilbraham Bros.

Best portable forge, bronze medal, Buffalo Forge Co.

Best hand blower, bronze medal, Buffalo Forge Co.

Best cold-pressed nut, silver medal, Hoopes & Townsend.

Best display of nuts, bolts, rivets, &c., gold medal, Hoopes & Townsend.

Best copper boiler and flues, silver medal, American Tube Works.

Best seamless copper pipe, silver medal, American Tube Works.

Best seamless brass pipe, silver medal, American Tube Works.

Best elevator buckets, bronze medal, B. F. Gump.

Best rawhide belting, silver medal, Chicago Rawhide Mfg Co.

Best cotton belting, silver medal, Gandy Belting Co.

Best boiler and pipe covering, silver medal, Shields & Brown.

Best hot-pressed nut, silver medal, J. H. Sturnburgh.

Best pneumatic transfer car, bronze medal, Lyman & L. La Rue Smith.

Best differential pulley blocks, silver medal, Yale & Towne Mfg Co.

Best pulley blocks, bronze medal, Penfield Block Co.

Best fire-extingusher for cars, bronze medal, M. Walker.

Best eye-bars, silver medal, Keystone Bridge Co.

A Comparison of the Working of a Blast Furnace with Blast varying in Temperature from 990° to 1414° F.*

BY W. HAWDON.

The question of the advantage gained by working a blast furnace with blast at a high temperature over that at a lower temperature has for some time past been much discussed; so much so that the subject is considered by many quite threshed out; extreme high temperatures are considered the savior of the pig-iron manufacturer in these days of keen competition, and that without such he will be left behind in the race. Only a few months ago we heard of 5 cwt. of coke per ton of iron being saved by the application of brick regenerative stoves, producing, of course, high heats; while one of the oldest of the Cleveland smelters, in his inaugural address as president of the Cleveland Institution of Engineers, gave it as his opinion last year that with a temperature of blast beyond 1000° F. no further economy in fuel would result. So various have been the statements of the effect produced on particular furnaces, and so startling the saving of coke said to have been made in many instances when brick heating stoves (which are the only means at the present day of obtaining a very high temperature of blast) were applied to these furnaces, that unless the varying circumstances of each particular case came under personal observation, it has been difficult for any one satisfactorily to account for the very much better order of things which prevailed under the new *régime*.

The reduction of silicon into the pig iron has always been a scare with many founders and managers when high heats are used in the reduction of pig iron from the ore, and this demands refutation if the success of high heats is to be accomplished. The fact has been that in many cases before the application of the higher heats the furnaces have been relined, and stoves capable of securing a high temperature of blast have replaced those capable of producing a temperature of only 500° to 700° F. The effect of increased temperature on small furnaces, particularly under such improved conditions, has been a marked improvement and economy in the working of the furnace. It is my intention to give the experience which I have gained in case of large furnaces, and with a blast already heated up to 1000° F., by further raising the temperature to somewhat over 1400° F. Part of the plant at the Newport Iron Works of B. Samuelson & Co., Middlesboro', is composed of a separate and complete plant of three blast furnaces, Nos. 6, 7, 8. Owing to circumstances, the center one (No. 7) was blown out in October, 1881, and as it had been in blast since June, 1870, the stoves, which were of the ordinary lean-to U-pipe type, were necessarily much worn, and would require extensive repairs to put them in thorough working order.

The writer visited several works where brick heating-stoves of the Cowper and Whitwell types were applied and high seats used, with the view of obtaining comparative information as to the saving effected thereby. Information freely given led to the expectation that the saving of ½ to 1 cwt. of coke per ton of pig iron would be effected by raising the temperature of the blast from 950° or 1000° to 1450° or 1500°, when applied to such furnaces as the one now specially under consideration, and that from 50 tons to 70 tons per week more pig iron would be made. It was decided to pull down the old pipe stoves and put up brick regenerative stoves. Those of the Cowper type were adopted, and I would just observe, in passing, that it is not intended by any remarks here made to put forward the superiority of any one type of brick stoves over another, but merely to indicate the description of stove used. The furnace has not been blown in yet, and the new stoves were therefore available for work at an adjoining furnace. This opportunity has been made use of by the writer to note observations and obtain particulars in connection with the working of this furnace when using blast heated in the U-pipe stoves to a temperature of 990° F., and in the brick stoves to 1414° F. Blast at the higher temperature was turned on a few hours after the lower was cut off, so that here we have an accurate comparison of the results obtained under the two conditions. The Cowper stoves, being built for No. 7 furnace, were placed some distance from No. 8, so that the blast had to pass through a tube 4 feet 3½ inches diameter and 67½ feet longer than is necessary if working the furnace for which the stoves were erected. This tube is lined with 14-inch fire-brick, and the loss of heat, taken by the thermometer on a calm day, was found to be 43° F., in consequence of this extra tubing. The furnace in question (No. 8) was blown in in February, 1872, and had therefore been in blast for 10 years—not a bad life for a furnace. But being in good condition and in a thorough state of repair, the comparison does not suffer thereby. The furnace is 85 feet high from hearth to platform level, and has a bosh 27 feet diameter, which is built at an angle of 66½°, or an inclination of 1 in 2.6. When the furnace was blown in, the well was 9 feet diameter. The tuyeres used are 5¼ inches diameter at the nose, but the muzzles of the "belly pipes," which project into the tuyeres to within 8 inches of the nose, have been varied

*A paper read at the spring meeting of the British Iron and Steel Institute.

(*Continued on Page 25.*)

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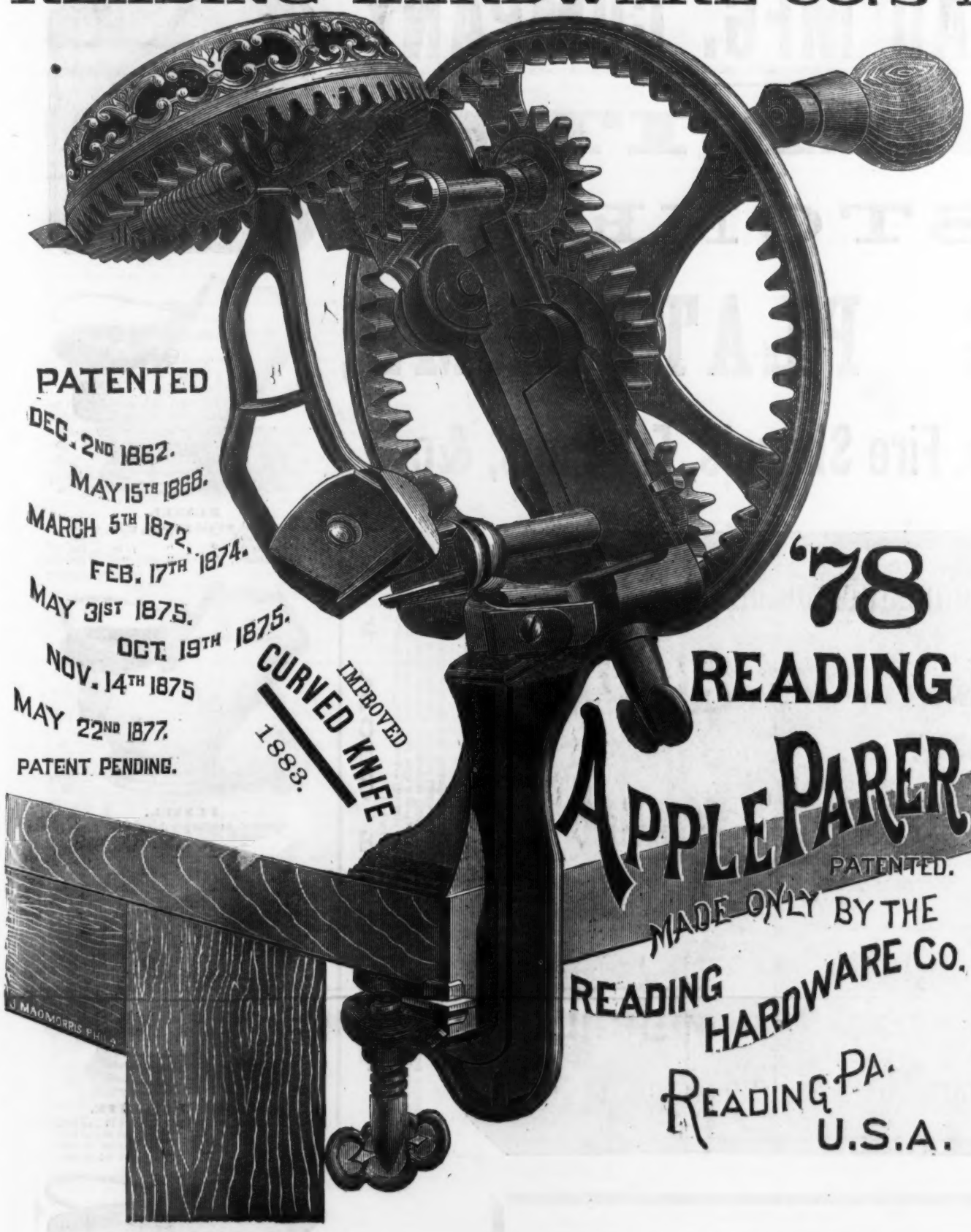

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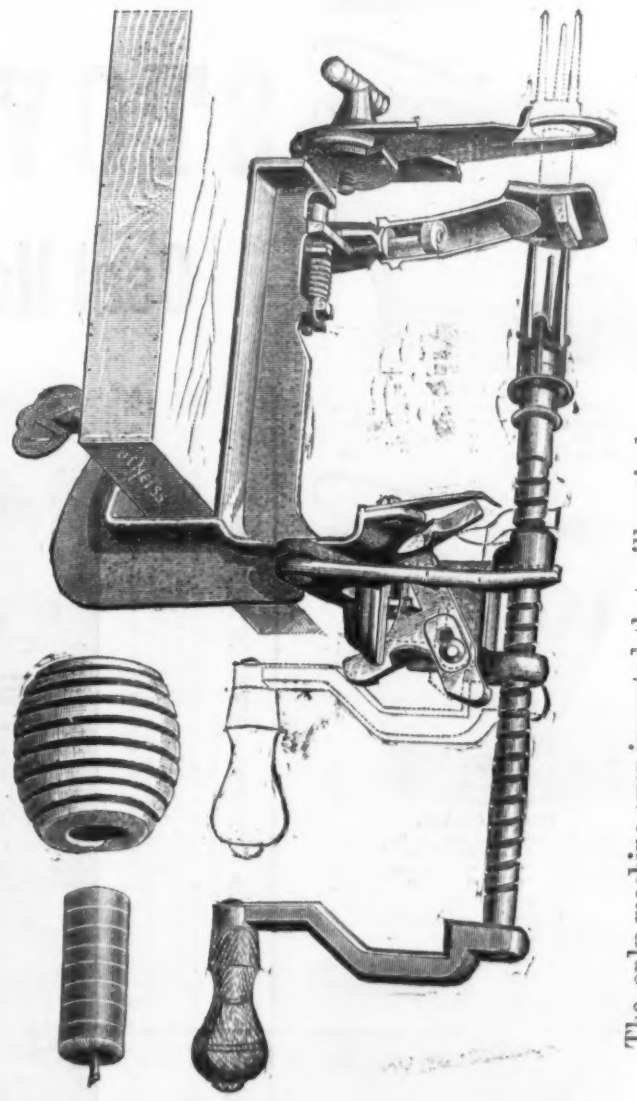

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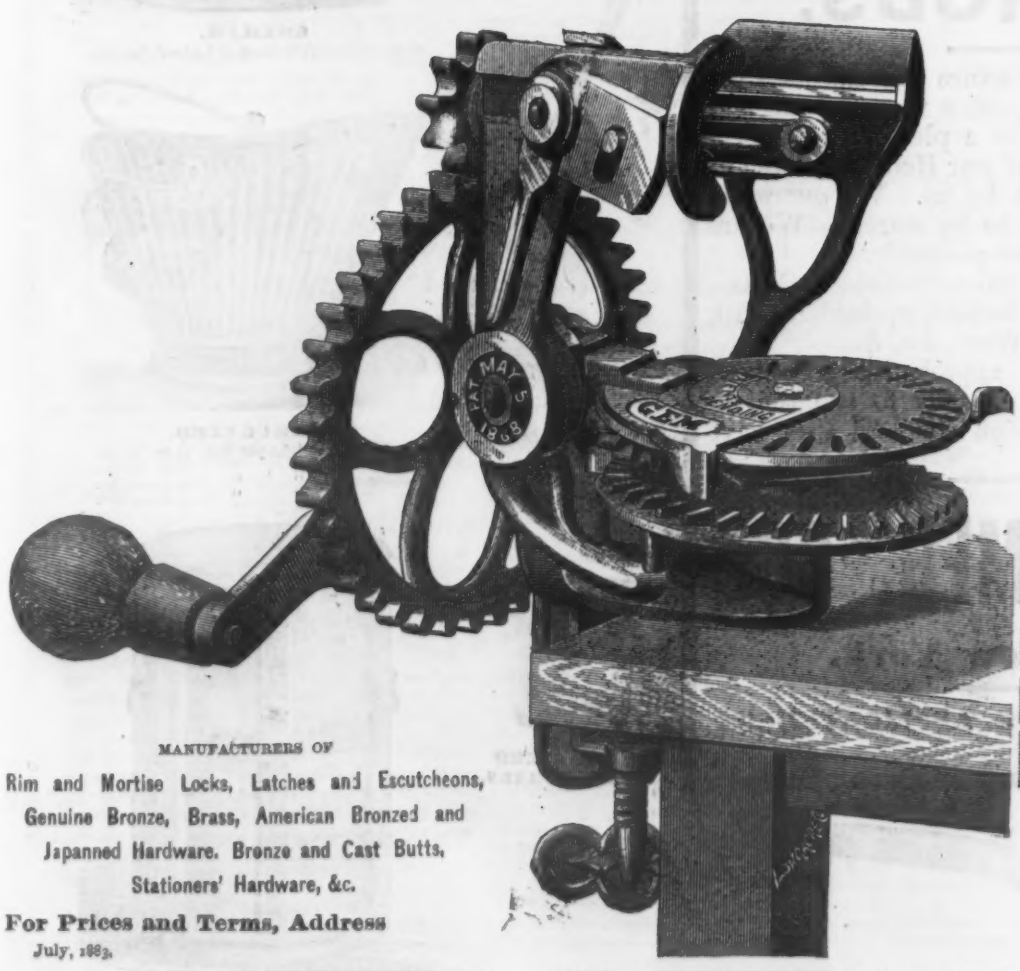

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(*Continued from Page 21.*)

somewhat, according to the temperature of the blast, as hereafter stated. The cubical capacity of the furnace is 29,410 feet, reckoning to within 2 feet 6 inches of the under side of the bell, which is 13 feet diameter.

The material used is Cleveland ironstone and limestone and coke from Durham. The coke is low in fixed carbon, having, according to analysis, only 88.8 per cent. This is probably accounted for by the fact that in process of manufacture the coal is only 42 hours in coking, giving a yield of 67.75 per cent. of coke. Were this coke manufactured under the ordinary long-hour system, whereby 89½ to 90 per cent. fixed carbon is obtained, the weight of coke used in smelting the iron would be proportionately lower. This should be borne in mind if comparison is made with the duty done by other cokes. The plan here adopted for comparison of the work done with different temperatures of blasts has been to tabulate the make of the furnace and yields of material per ton of iron over periods of some weeks, giving the temperatures of the blast and the gas during each period. Calculating from an analysis of the gas, we obtain some check on the recorded yields given, and we are also enabled to give a comparison of the work done by the furnace under the varied conditions by comparing the sum of the heat units contributed from the two sources of supply—coke and blast—and which are the variable elements under consideration, together with the temperature of the escaping gases. These yields of the materials used have been obtained by carefully weighing the barrows as they pass up to the furnace-lift. The yields for the seven weeks ending November 18, 1882, were as follows, the average temperature of blast over this period being 990° F., and the furnace working with the U-pipe stoves:

PER TON OF IRON MADE.

Pig iron m'de per week, tons.	Quality.	Coke.	Limestone.	Calcined ironstone.	Purple ore.	Silicon in No. 3 pig iron, per cent.
400	3.23	23.8	11.5	47.2	0.36	2.4

The small amount of purple ore, containing 64 per cent. of iron, was used for "damping" the bells. The pressure of blast was 4⅞ pounds per square inch at the engine house, and 4½ pounds at the tuyeres, of which there are five, the muzzles of four being 4¼ inches diameter, and one over the tapping-hole 3¼ inches diameter = 67.76 square inches area. The furnace was now connected with the brick stoves, which had been previously thoroughly dried. But as it was thought advisable at first not to press them, we worked with a moderate temperature only. The mean temperature over the next four weeks ending December 16, 1882, was 1168° F., the tuyere area and blast pressure being the same as before. The following were the yields for this period:

PER TON OF IRON MADE.

Pig iron m'de per week, tons.	Quality.	Coke.	Limestone.	Calcined ironstone.	Purple ore.	Silicon in No. 3 pig iron, per cent.
409	3.36	23.21	11.5	47.4	0.36	2.6

The coke, it will be observed, is reduced by .59 cwt. per ton of iron, while there is a slight increase in make; and as the silicon had somewhat increased, ½ cwt. per ton of limestone was added to the charge. The diameter of the tuyere muzzles was now increased to 4¾ inches. The mean temperature over the two weeks ending January 27, 1883, was 1295°. The following are the yields for this period:

PER TON OF IRON MADE.

Pig iron m'de per week, tons.	Quality.	Coke.	Limestone.	Calcined ironstone.	Purple ore.	Silicon in No. 3 pig iron per cent.
449	3.35	23.09	12.12	47.4	0.36	2.5

Here it will be observed the make increased considerably, and there was a further small diminution in the coke per ton of iron, although the burden of limestone had been somewhat increased. The diameter of the tuyere muzzles was again increased to 5¼ inches, and the mean temperature of the blast over seven weeks, ending March 17, 1883, was 1328° F. The following are the yields:

PER TON OF IRON MADE.

Pig iron m'de per week, tons.	Quality.	Coke.	Limestone.	Calcined ironstone.	Purple ore.	Silicon in No. 3 pig iron, per cent.
461	3.14	22.3	12.16	47.25	0.35	2.6

A larger make, a somewhat better quality, and a further saving of .21 cwt. of coke will be here noted. The iron at this time was dry and "rich" in appearance, an evidence of too much heat. The burden was therefore increased, with the following result, over the two weeks ending March 31, 1883:

PER TON OF IRON MADE.

Pig iron m'de per week, tons.	Quality.	Coke.	Limestone.	Calcined ironstone.	Purple ore.	Silicon in No. 3 pig iron, per cent.
478	3.09	20.3	12.9	47.02	0.35	2.6

The temperature over this period was 1400° F. The make was smaller than in the preceding period, but on account of short stoppages for repairs of the furnace, the working time of the furnace was shorter. In order to ascertain if the temperature of the escaping gases was affected by the increased temperature of the blast, tests were made over a period of 12 hours, and taken every 15 minutes or thereabouts. The temperature of the escaping gases varies so much over any given period that a test taken at random, or even over a couple of hours, is very misleading. The time of lowest temperature is, of course, when a large amount of material has been charged into the furnace. This, in the course of ordinary working, is as low as 323°, and gradually increases during the time that charging operations are suspended. The results of trials taken throughout the day, October 31, 1882, when the average temperature of the escaping gases was 490° F., show that the average temperature of blast was 1065° F. As the rise in temperature was gradual after charging had ceased, the trials were not so frequently made, but that is allowed for in taking the average temperature. The temperature of gases was taken in a similar manner over 12 hours on other occasions, showing:

	No. 1.	No. 2.
Average temperature of gas...	468° F.	448° F.
Average temperature of blast.	1,139° F.	1,493° F.

From this it would appear that the temperature of the escaping gases decreases with the decrease of fuel, although this decrease of fuel is compensated for by an increased blast temperature. The volume of the escaping gases is smallest when the higher temperatures of blast are used, since, when this is the case, the amount of fuel consumed is smallest, and consequently the amount of air blown in to consume this fuel is smallest. The weight of gas per ton of iron we find to be 133.3 cwt. when the blast is 1376° F. The volume of the escaping gases is largest when the blast temperature is low, since, when this is the case, the amount of fuel consumed is larger, and consequently the amount of air blown in to consume this fuel is also larger. The weight of gas per ton of iron we find to be 140.8 cwt. when the blast is 990° F. In both cases the gases, in passing up the furnace, pass through the column of material—viz., coke, mine and limestone, which is charged in at the top of the furnace. The materials in passing down the furnace absorb practically the same amount of heat in both cases. But since the volume of the escaping gases in one case is less than the volume in the other, the temperature of the gases when they are leaving the furnace will be lower when the volume is small than when it is greater, granting, at the same time, that the furnace is of sufficiently large capacity to allow of absorption with the quicker driving—that is, when the gases are passing off more rapidly. In order to ascertain how much of the ironstone remained uncalcined after it had passed through the calcining kilns, samples were taken in bulk in the following manner: Three shovelfuls of mine were taken from each of the six openings of the kilns, and the whole thoroughly mixed. This operation was repeated at each kiln. About one-quarter of the mine from each kiln was taken for sample and thoroughly mixed together. This was crushed in a mortar-mill and a sample taken to the laboratory. An average of five such samples of calcined stone, as determined by Mr. Stead, to whom I am indebted for the analyses given in this paper, gave the subjoined result. I give in the appendix the results of Mr. Stead's analyses of the escaping gases, and also, in the same place, the calorific value of the various sources of heat supply, having, in connection with Mr. Stead, gone so far into this subject as to illustrate a comparison of the results obtained of the work done by the furnace under consideration when the air was blown in at a temperature of 990° F., and again at 1376° F.:

	Per cent.	Cwt. per ton.	Oxygen.	Carbon.
Fe_2O_3	49.38	24.01	7.2	....
FeO	4.72	2.30	0.51	....
CO_2	2.98	1.45	1.00	0.39
Loss by calcination	3.11	1.51	....	...
SO_3	0.66	0.32	0.19	....
	....	....	8.96	0.39

This gives metallic iron = 38.13 per cent. The CO_2, of course, passes off at the top of the furnace, and affects the calculation in computing the weight of carbon which passes down to the tuyeres. It is therefore necessary, in computing the value of the gases, to make the allowance for this uncalcined stone. The unburnt stone is chiefly found in the center of the large lumps, and although the stone may appear almost perfectly calcined, yet in the best constructed kilns 2 to 3 per cent. is generally found to be the further loss when a sample taken from the kilns is submitted to perfect calcination in a muffler. Samples were taken from the kilns at other works in Middlesboro', when the stone was well burnt, and gave further loss of 1.8 and 2.1 per cent., respectively. The practical work accomplished in this furnace by increasing the temperature of the blast from 990° F. to 1414° F. has been a saving of 1½ cwt. coke per ton of iron, and an increase in make of 60 tons per week, with a better quality of iron by nearly one-fourth of a grade, and that, too, without any increased reduction of silicon into the iron, though it would appear that rather more limestone is required when the higher heats are used. It becomes now an easy matter to calculate whether it is worth while pulling down old pipe stoves at any particular stage of wear and tear, and replacing them with the effective brick heating stove of the Cowper, Whitwell or similar type. A very important item in connection with the working of brick regenerative stoves in place of the ordinary U-pipe stove appears to have escaped general observation. I refer to the amount of gas required to heat the blast by this method. The pipe stoves in use at Newport Iron Works are of modern construction, and may be taken as among the best of the kind. There are nine to each furnace, eight of which are at work, while one is off for cleaning purposes. Each stove has 12 pipes, with a heating surface of 100.48 square feet per pipe = 1205.76 square feet per stove, giving 8 × 1205.76 = 9646 square feet of heating surface per furnace. The cubical contents of each stove = 1781 feet. That of the pipes in each stove = 320 cubic feet, which, deducted from the former, gives 1461 cubic feet in each stove to be filled with the gases in combustion. This gives 8 × 1461 = 11,688 cubic feet per furnace. Therefore the proportion of heating surface of the pipes is to the cubical capacity of the stove as 9646 square feet heating surface: 11,688 cubic feet capacity of stoves, or as 1 : 1.21. Now, in the Cowper stoves, which are at work at this furnace, one working the blast while the other is being heated with the gas, there are 42,860 square feet of available heating surface per stove.

	Cubic feet.
The cubical capacity of each stove....	18,610
That of the bricks.....	8,406
Difference.....	10,204

Therefore the proportion of heating suface is to the cubical area as 42,857 square feet: 10,204 cubic feet, or as 42 is to 1, as against 1 : 1.21 in the other case, showing a great economy of space to be filled by gas under combustion in the brick stove. And, moreover, the outside surface of the brick stove is much less than that of the pipe stoves, giving thereby less surface for radiation. In the pipe stove there is not sufficient length of time, nor is the surface of the pipes of sufficient area, to allow of the complete absorption of heat from the burning gases. But the gas which is ignited at the bottom passes rapidly and directly through the stove and out of the chimney at the top, where it escapes at the high temperature of 1240° F.; while with a well-designed brick stove the gas has a long way to travel, a large surface of bricks to pass over, travels at a much slower rate than is the case in the pipe-stove, and consequently the heat is so thoroughly absorbed by the bricks that the gases escape into the chimney at a temperature (from the Newport stoves) of 250° F. The escaping gases analyze as follows:

	From the pipe stoves. Per cent.	From the Cowper stove. Per cent.
N	74.34	74.75
CO_2	24.30	24.15
CO	Nil	Nil
O	1.46	1.10
H	Nil	Nil
	100.00	100.00

Showing in both cases very little excess of air. In order to ascertain the amount of gas passing through the various flues to the stoves, boilers, &c., readings were taken by Swan's tube anemometer, with the result that the sum of the amounts passing down the gas tubes from the two furnaces in blast showed only an excess of 3.6 per cent. over the sum of the amount passing into the various stoves and boilers, thus showing comparative accuracy in the readings. The anemometer showed exactly the same amount of gas passing down the gas tube from each furnace. The pipe stoves at work on the No. 6 furnace are identical with those formerly at work on No. 8. One of them was off for repairs and one cleaning, leaving seven at work. Taking the sum of the amounts of gas passing down the two gas tubes as unity, they being the source of supply, we have:

	Per cent.
To the Cowper stoves.....	14.9
To the seven pipe stoves.....	23.4
Through the gas-flue to the boilers...	61.7
Total.....	100.00

Now we find that the gas per ton of iron passing from No. 8 furnace = 133.3 cwt., the anemometer reading being taken at the same time, giving at the rate of 266.6 cwt. per ton passing from the two furnaces as our gas supply. The sum of the two amounts = at the rate of 266.6 cwt. gas per ton of iron to each of the sets of stoves which respectively supply one furnace; but in the case of the boilers, the number of tons is at the same time doubled, the steam supply from the boilers being to both furnaces, the make at the two furnaces being nearly the same. This gives us—

	Cwt. gas per ton of iron.
To the Cowper stoves.....	39.63
To the seven pipe stoves.....	62.25
Through the gas-main to boilers.....	164.12 + 2
Total.....	266 cwt.

Take first the Cowper stove. From the gas analysis 27.34 per cent. is CO = 11.71 C. This per cent. of 39.63 cwt. = 4.64 cwt. carbon. Hence we have developed—

	Cwt. heat units.
(CO to CO_2) 4.64 × 5600.....	25,984
Hydrogen = ...	1,456
Sensible heat of gas, 39.63 × 102° C. × .2	970

We have carried our heat units from—

		Heat units.
Blast (746°+42° loss from stove to tuyere) = 788° C. × 98.17 × .237.....		18,333
From waste gases.....	39.63 cwt.	
Add weight of air required to 4.64 cwt. C from CO to CO_2 and 0.03 cwt. H, and due to 1.1 per cent. excess of O in waste gas.....	29.24 "	
	68.87 "	
68.87 × 140° × .24.....		2,313
Leaving for radiation.....		7,304
Total.....		28,010

Take now the pipe stoves—11.7 per cent. of 62.25 cwt. = 7.28 cwt. carbon. This develops (CO to CO_2):

	Heat units.
7.28 × 5000.....	40,768
Hydrogen.....	1,700
Sensible heat in gas, 62.25 × 102 × .24	1,523
	41,991

We have passing out—

	Heat units.
Blast 531° C. × 105 cwt. × 237. ..	13,960
Waste gases (62.25 + 49.9 = 112.15 cwt × 671° × .24).....	18,061
Leaving for radiation..... ..	11,970
	43,991

In this latter case 105 cwt. of blast is taken as being used, as is the case with the lower temperature of blast. The difference (625 — 39.63) = 22.62 cwt. gas per ton of iron, represents the amount of gas saved by using the brick stove in preference to the pipe stove, and might, with proper application, be used for calcining the ironstone, where that is necessary, or for other purposes. Now, 22.62 cwt. is 16.9 per cent. of 133.3 cwt.; or, in other words, the saving effected by heating the gas in the brick stoves is equal to 16.9 per cent. of the whole of the gas given off from the furnace. Of this 26.3 per cent. is CO = 6 cwt. CO per ton of iron, which, when burnt to CO_2, gives 2.57 C × 5600 = 14,393 cwt. heat units. The caloric power of the small coal used in the Cleveland district for calcining purposes may be taken at 7000; so that if this heat were applied to calcine the ironstone, it would represent $\frac{14,393}{7,000}$ = 2 cwt. (about) of small coal per ton of iron made. At the Newport Works we use 2¾ cwt. small coal to calcine the ironstone required to make 1 ton of iron. At some works with high kilns, as small an amount as 2 cwt. only is required. A certain amount of this, doubtless, passes off burnt to only the first degree, or CO. Therefore we find that the saving in gas by using the brick stove is about the quantity requisite to calcine the ironstone for use in the furnace. The ordinary type of calcining kilns is without doubt unfitted for this mode of firing; but it does not appear unlikely that kilns can easily be adapted for the purpose. A great advantage is found in using the brick stoves during the prevalence of high winds, owing to the better draft of the chimney, when, as every furnace manager knows, it is impossible to maintain the heats with the ordinary type of U-pipe stove. We may, therefore, congratulate the inventors of brick regenerative stoves on having introduced an improved mode of heating the air, though the advantage, when compared with the cast-iron pipe stoves, where the services they render give such fair results as 1050° to 1100° F. of blast temperature, is not, according to our experience, equal to that which has in some instances been claimed for them. As an instance of the saving effected, we will take the No. 8 furnace at Newport Works; the Cowper stoves are built of the best Wortley fire-bricks, and the whole workmanship is of the best quality. They cost £2200 each = £4400 per furnace, without the foundations, which were already in, and the chimney, which is large enough to drive stoves for three furnaces, costs £270:

	Per year.
Interest and depreciation on the Cowper stoves at 15 per cent.....	£700 0 0
Interest and depreciation on the pipe stoves at 15 per cent...	495 0 0
Difference.....	£205 0 0
Saving in coke, as in the Newport case, 1½ cwt. per ton, 11¼d. One-fourth better grade in quality = 3d per ton. Total saving, 14¼d per ton. On 400 tons per week, say 20,600 per year....	1,223 2 6
Deduct.....	205 0 0
Total saving per annum in favor of the brick stoves.....	£1,018 2 0

There remains, in addition, the saving of gas, which, if properly applied, is no inconsiderable item, and the profit—when such a desirable result is accomplished—on the extra make.

APPENDIX.

By John E. Stead and W. Hawdon.

The analyses of 11 samples of gas, taken up to November 16, 1882, were found by Mr. Stead to be as follows:

	Volume.	Weight.	Oxygen.	Carbon.
N.....	59.02	57.07	....	....
CO.....	27.97	26.63 =	15.22	12.41
CO_2.....	10.83	16.21 =	11.79	4.42
H.....	1.28	.09	....	....
	100.00	100.00	27.01	15.83

Oxygen brought in with N in air = 17.48 parts.

There is reduced in the pig iron:

	Cwt. per ton.	Oxygen.	Carbon.
SiO_2.....	1.03	.55	....
P_2O_5.....	.31	.40	....
MnO.....	.10	.02	....
Add to this from the calcined stone..... ...		8.96	0.39
Total from ore and pig iron..	99.3		0.39

Taking 11½ cwt. of limestone with 42 per cent. CO_2 = 4.83 cwt. CO_2 = 1.36 cwt. carbon and 3.64 cwt. oxygen per ton of iron.

Summary of oxygen and carbon charged with the ironstone and limestone, allowing for 3 per cent. further loss in ironstone:

	Oxygen. Cwt.	Carbon. Cwt.
From ore as above.....	9.93	0.39
From limestone	3.49	1.30
	13.42	1.69

As we have in 100 parts of the gas, as shown above, 27.01 parts O, of which 17.48 parts are contributed by the blast, therefore there will be (27.01 — 17.48) = 9.53 parts O derived from the ore and limestone.

Then 9.53 : 13.42 :: 100 = 140 cwt. of gas per ton of iron, and since 100 parts of gas contain 15.83 parts of C, we have:

	Cwt. C.
100 : 15.83 : : 140.8.....	22.28
Deduct due to ore and limestone.....	1.69
	20.59
Add combined with pig iron.....	.6
	21.19

Since the coke contains 89 per cent. fixed carbon nearly, we have 89 : 100 :: 21.19 = 23.8 cwt. coke per ton of iron, an amount which exactly agrees with the return from the furnace weigh-book, as before shown.

ANALYSIS OF GAS FROM MARCH 17 TO 24, 1883.

	Volume.	Weight.	Oxygen.	Carbon.
N.....	59.17	56.34	....	....
CO.....	28.71	27.34	15.63	11.71
CO_2	10.85	16.23	11.81	4.42
H.....	1.27	.09	....	....
	100.00	100.00	27.44	16.13

O due to air = 17.26 parts.

O and C due to ore and limestone (12 cwt.)

	Oxygen.	Carbon.
From the ore as before.....	9.93	.39
From the limestone.....	3.64	1.36
	13.57	1.75

In 100 parts of gas we have 27.44 parts O, of which 17.26 parts are contributed by the blast.

We have 27.44 — 17.26 = 10.18 parts O derived from ore and limestone. Then 10.18 : 43.57 :: 100 = 133.3 cwt of gas per ton of iron.

We have 100 parts of gas containing 16.13 parts C:

	Cwt. C.
100 : 16.13 : : 133.3.....	21.50
Less due to ore and limestone.....	1.75
	19.75
Add combined with iron	.6
	20.35

Which is (89 : 100 :: 20.35) = 22.8 cwt. coke per ton of iron.

We will now examine the variable sources of heat supply, viz., the coke consumed in smelting a ton of iron and the heat given in with the blast, taking into consideration also the variable amount of heat carried off from the furnace with the gas which is consequent on any change in the former source of supply. Speaking of the circumstance under consideration, the number of heat units required to smelt the ore and limestone requisite to produce a ton of pig iron is constant (except when the limestone was increased, and this is allowed for in the summary following), and therefore the only items which it is necessary to deal with for comparison are the weight of coke consumed, the temperature of the blast and the temperature of the escaping gases.

Taking the average analysis of gas from October 23 to November 16, 1882, we have the weight of gas = 140.8 cwt. per ton of iron.

	Cwt.
Carbon from coke (23.8) cwt. per ton of iron..	21.19
Carbon from ironstone.....	.39
Carbon from limestone.....	1.30
Total amount of C charged into furnace..	22.28
C from $CaCO_3$ carries off an equal weight of C from coke (CO_2 × C) = 2 CO..... ... .2.6 cwt.	
C from ironstone..... . ..... .39 "	
C absorbed by pig iron..... .6 "	
	3.59
Leaving C burnt at tuyeres	18.89

	Cwt. heat units.
19.20 × 2400	46,296
C in CO_2, in gas per ton of iron = 6.22 cwt. — .39 (C from ironstone) = 5.83 × 5600.	32,648
Heat contributed by blast = 105 cwt. air × .237 × 532° C.....	13,239
	92,183
Deduct from this:	
Heat absorbed by decomposition of 11.5 cwt. limestone × 370*..... 4255	
Heat carried off in 140.8 cwt. gas at 254° C × .24. ..... 8583—	12,838
Total heat units utilized in furnace...	79,345

* I. L. Bell.

Take now the average gas analysis from March 15 to 24, 1883. We have the weight of gas = 133.3 cwt. per ton of iron.

	Cwt.
Carbon from coke (22.8 cwt.) per ton of iron	20.35
Carbon from ironstone.....	.39
Carbon from limestone.....	1.36
	22.10
C from CaO_3 carries off an equal weight of C from coke (CO_2 × C) = 2 CO..... 2.72 cwt.	
C from ironstone..... ... .39 "	
C absorbed by iron..... .6 "	3.71
Leaving C burned at tuyeres.....	18.39

	Cwt. heat units.
18.30 × 2400	44,136
C in CO_2 in gas per ton of pig iron = 5.89 cwts. — .39 from ironstone = 5.5 cwts. × 5600..	30,800
Heat contributed by blast, 98.17 cwt. air × .237 × 746° C.....	17,356
	92,292
Deduct from this:	
Heat absorbed in decomposition of 12 cwt. limestone × 370..... 4440	
Heat carried off in 133.3 cwt. gas at 231° C. × 24..... 7390	11,830
Total cwt. heat units utilized in furnace.....	80,462

Comparing this with the result obtained (October 23 to November 16), we have the difference 80,460 — 79,345 = 1117 heat units. This is accounted for by the extra heat required to smelt .27 cwt. increased weight of slag = 148 heat units. Heat absorbed in decomposing the extra weight of CO_2 in ½ cwt. extra limestone. C in this CO_2 = .06 × 3200 = 192 heat units. These two items (148 + 192) deducted from 1117 = 777 heat units difference in the number utilized in the furnace. This is accounted for in the better quality of iron produced in the latter case.

TEMPERATURES OF ESCAPING GASES AND BLAST TAKEN THROUGHOUT THE DAY, OCTOBER 31, 1882.

	Gas.	Blast.	
A.M.	Degs.	Degs.	
6.40...	772	.....	No charge in since about 4 a m
7.0 ...	492	1,080	5 minutes after 2d charge.
7.18...	430	.....	5 " " 4th "
7.27...	510	.....	17 " " 4th "
7.41...	408	.....	31 " " 4th "
7.56...	423	.....	7 " " 5th "
8.11...	423	.....	11 " " 6th "
8.24...	502	.....	24 " " 6th "
8.41...	528	.....	41 " " 6th "
8.54...	531	.....	3 " " 7th "
9.7 ...	452	.....	6 " " 8th "
9.21...	.....	1,001	.....
9.26...	527	.....	25 " " 8th "
9.40...	501	.....	3 " " 9th "
9.55...	332	.....	8 " " 10th "
10.10...	323	.....	3 " " 12th "
10.23...	424	.....	16 " " 12th "
10.36...	476	.....	29 " " 12th "
10.50...	530	.....	6 " " 13th "
11.6 ...	353	.....	6 " " 13th "
11.20...	351	.....	7 " " 16th "
11.30...	.....	1,055	.....
11.50...	406	.....	37 " " 16th "
P.M.			
12.2 ...	425	.....	49 " " 16th "
12.6 ...	.....	.....	Blast off, casting.
12.14...	.....	.....	Blast on again.
12.20...	473	.....	.....
12.39...	573	.....	.....
12.55...	600	.....	.....
1.8 ...	575	.....	.....
1.26...	654	.....	.....
1.35...	628	.....	.....
1.48...	652	.....	.....
2.1 ...	628	.....	17th charge.
2.18...	578	.....	.....
2.35...	.....	1,170	.....
2.50...	430	.....	19th charge.
3.7 ...	329	.....	10 minutes after 20th change.
3.20...	428	.....	.....
3.34...	419	.....	21st charge.
3.45...	325	.....	.....
3.58...	324	.....	1 minute after 22d charge.
4.11...	323	.....	14 minutes after 23d charge.
4.29...	457	1,079	Ceased charging.
4.40...	439	.....	.....
4.53...	455	.....	.....
5.5 ...	528	.....	.....
5.30...	578	.....	.....
6.15...	720	.....	Commenced charging.

Cast Iron of Unusual Strength.—In our issue of June 14th, and embraced in the report of the meeting of the American Institute of Mining Engineers at Roanoake, Va., we gave an abstract from a paper on "Cast Iron of Unusual Strength," read by Mr. Edward Gridley, of Wassaic, N. Y. Referring to this notice, Mr. Charles E. Coffin, manufacturer of the Muirkirk charcoal pig iron, of Muirkirk, Prince George's County, Md., writes us to the effect that for a number of years past he has produced cast iron exhibing similar properties. Accompanying the letter we find a pamphlet giving the results of a series of tests at the Navy Yard, Washington, from which it appears that the best sample tested exhibited a strength of 47,756 pounds per square inch, while Mr. Gridley's best sample showed only 47,500 pounds per square inch. These tests, Mr. Coffin informs us, were made in different years—1875, 1879 and 1882, thus showing that he can make the iron at any time. All the samples tested were taken from pigs made with the usual mixture of Muirkirk ore.

Work on the south tunnel under the Hudson river, which was delayed by the death of Trenor W. Park, is now under way at the foot of Morton street. Sections of 10 feet each will be completed every 20 days. A new syndicate for pressing the work has been formed. It is thought less difficulty will be experienced in the new caisson than was the case in the north tunnel. Of that tunnel 1600 feet have been excavated from the New Jersey side and 170 from this side.

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1 " 18 " " 7 " " 2d hand.
1 " 18 " " 6 " "
1 " 18 " " 6 " " New.
1 each Engine Lathes, 17 in. swing, 6 ft., 7 ft., 8 ft., 10 ft. bed. New.
1 Engine Lathe, 17 in. swing, 6 ft. bed. 2d hand.
1 " 16 " " 6 " "
1 " 15 " " 9 " "
1 " 15 " " 6 " "
2 " 15 " " 6 " " New.
1 " 14 " " 6 " " 2d hand.
1 " 13 " " 6 " " New.
3 " 13 " " 5 " "
1 " 12 " " 5 " "
1 " 11 " " 5 " " 2d hand.
1 " 11 " " 5 " " New.
1 " 10 " " 4 " "
2 Hand Lathes, 15 in. x 5 ft. bed. New.
2 " 12 in. x 4 ft. bed. 2d hand.
1 " 12 in. x 4½ ft. bed. New.
1 " 12 in. x 4 ft. bed. New.
1 " 11½ in. x 4 ft. bed. New.
1 " 10 in. x 3 ft. New.
6 " 3 ft. x 4 ft. bed, 10½ in. swing. 2d hand,
5 Single Head Lathes, 13 in. swing, 4 ft. bed. 2d hand.
1 Bench Lathe, 8¼ in. x 3 ft. bed. New.
1 Foot Lathe, 8¼ in. x 3 ft. bed. New.
1 Foot Lathe, 12 in. x 4 ft. bed. New.
1 Foot Lathe, 8 in. x 2 ft., 8 ft. bed. New.
1 Turret Lathe. 2d hand. 16 in. x 5 ft. bed.
1 Planer to plane 32 in. x 30 in x 10 ft. 2d hand.
1 Planer to plane 34 in. x 32 in. x 12 ft. 2d hand.
1 Planer to plane 27 in. x 27 in. x 7 ft. New.
1 Planer to plane 24 in. x 24 in. x 8 ft. New.
1 Planer to plane 22 in. x 22 in. x 4 ft. New.
1 Planer to plane 20 in. x 20 in. x 4 ft. New.
1 Planer 20 in. x 4½ ft. 2d hand.
2 Planers to plane 16 in. x 16 in. x 3 ft. New.
3 Crank Planers. New.
1 Shaping Machine, 12-in. stroke, 33-in. traverse. New.
1 Shaping Machine, 12-in. stroke, 28-in. traverse. New.
2 Shaping Machines, 7-in. stroke. 2d hand.
1 Back-geared Milling Machine. New.
1 Milling Machine, with Arm. New.
1 Hand Milling Machine. New.
5 Lincoln Millers, worm feed. 2d hand.
1 Index " 2d hand.
1 Vertical " "
3 Hand " "
1 Double face " "
1 Automatic Milling Machine. New.
3 24-inch Upright Drills, Bk. Gr. and Self Fee d. New.
1 20-inch Lever Feed Upright Drill. New.
1 20-inch Lever and Wheel Feed Upright Drill. New.
1 Sensitive Drill New.
1 4-Spindle Drill Press. New.
1 3 " " " "
1 2 " " " "
7 Gang or Multiple Drills, 2, 3 and 6 spindles. 2d hand.
1 Single Spindle Light Drill, Table Feed. New.
1 Single Spindle Profiler. New.
1 Two " " Light. New.
2 Profilers. 2d hand.
2 Turret Head Chucking Machines. 2d hand.
1 Broaching Machine. 2d hand.
1 Cutting Off Machine, 2½ in. 2d hand.
1 No. 1 Screw Machine, wire feed. 2d hand.
1 Screw Machine. New.
1 " Slotter. "
1 Cutter Grinder. "
6 Emery Grinders. New.
1 Slitting or Circular Shear. New.
2 Tapping Machines.
1 13 ft. Bending Rolls. 2d hand.
1 40 in. Car Wheel Borer. 2d hand.
3 Hand Shears. 2d hand.
3 Power Presses. New.
1 Foot Press. New.
1 Screw Press. New.
1 Drop Press. New.
1 Drop Press, 50 lb. Hammer. 2d hand.
1 Lot Heavy Polishing Frames 2d hand.
9 Shafting Straighteners. New.
1 10 x 12 Stationary Engine. New.
1 9½ x 12 in. Stationary Engine. New.
1 5 in. x 6 in. Stationary Engine. New.
1 10 H. P. Upright Boiler. New.
1 5 x 12 Stationary Engine. 2d hand.
1 10 H. P. Cylinder Boiler. 2d hand.
1 No. 1 Steam Pump. 2d hand.

Wood-Working Machinery.

1 Double Saw Bench. New.
1 24-in. Surfacer Rotary Bed. New.
1 Band Sawing Machine. New.
1 Scroll " "
1 Rod Machine. Self Feed. "
1 Sandpapering Machine. 2d hand.
1 8-in. Molder, 4 sides. 2d hand.
1 Edge Molding Machine. 2d hand.
1 Daniels Planer. 2d hand.
1 Large Lot 2d-hand Pulleys and Hangers.
And lot of others, both new and 2d hand.

If the list does not contain what you want, write us.

J. M. BADGER & CO.,

49 DEY STREET, New York City.

VALUABLE PROPERTY FOR SALE.

The Hardware Works, Tenth and Spruce Streets, Reading, Pa., consisting of Foundry, Machine Shops, Warehouse, and other buildings, machinery, etc., all in first class running order. One entire block of ground. Ample room for extension. Will be sold on easy terms. Apply to

F. C. SMINK,
Reading, Pa.

For Sale.

One-third or one-half interest in a large Foundry and Machine Works now doing a large and paying business. Located in one of the largest and most rapidly growing towns in the South. Indispensable that the party should be a No. 1 office man and financier.

Address "FOUNDRY 44,"
Office of *The Iron Age*, 83 Reade street, New York.

WANTED.—A permanent position as Manager, Superintendent or Designer and Draftsman by an energetic man who knows his business and scientifically educated, with long, practical experience in originating all kinds of new machinery, both light and heavy, and boilers, estimating their cost and price, and superintending their construction, and the management of help.

Address "F,"
80 East Eighth St., Oswego, N. Y.

Executors' Sale.

PHILADELPHIA HYDRAULIC WORKS.

The Executors of the Estate of Isaac S. Waterman, deceased, offer for sale the Stock, Tools and Fixtures of the Philadelphia Hydraulic Works, together with the property n. e. cor. Washington ave. and 21st st. Lot, 125 x 200 feet. The works are running full time on orders.

For terms, &c., apply at No. 407 Library St.

WANTED.—Position as Roll Turner. Seventeen years' experience on all kinds of Shape and Bar Rolls. Or will take the turning and rolling for one Guide Mill.

Address "J. E. J.,"
Office of *The Iron Age*, 220 S. 4th St., Phila., Pa.

Special Notices.

New & Second-Hand Machinery.

FEB. 21, 1883.

1 Engine Lathe, 14 in. x 5, 6, 7 and 8 ft. Grant & Bogert.
1 " " 26 in. x 12 ft., Grant & Bogert. New.
1 " " 48 in. x 14 ft. Good order.
1 " " 36 in. x 12 to 17 ft. New.
1 " " 42 in. x 14 ft. New.
1 " " 14 in. x 6 ft. Star Tool Co. New.
1 " " 16 in. x 6 ft. New.
1 " " 14 in. x 5 x 6 ft. New.
1 " " 16 in. x 7 ft. Bridgeport. New.
1 " " 13 in. x 5 ft. and 6 ft. Ames. New.
1 " " 16 in. x 5, 7 and 8 ft. Ames. New.
1 " " 18 in. x 8 and 10 ft. Lodge & Barker. New
1 " " 27 in. x 10 in. Lodge & Barker.
1 " " 22 in. x 12 ft. New.
1 " " 20 in. x 10 ft. New.
1 " " 26 in. x 16 ft. New.
1 " " 24 in. x 12, 14 and 16 ft. New.
1 " " 11 in. x 4 ft. and 5 ft. Prentiss. New
1 " " 13 in. x 5 ft. Young. New.
1 Plain Engine Lathe, 16 in. x 4 ft. New.
1 " " " 16 in. x 4 ft. New.
1 Fox Lathe, 15 in. x 5 ft. Am. Tool & Machine Co.
1 15 in. x 4 ft. Turret Lathe. Lodge & Barker.
1 Fox Turret Lathe, 16 in. x 6 ft. Lodge & Barker. New
1 Planer, 40 in. x 40 in. x 17 ft. Good order.
1 " 32 in. x 32 in. x 7 ft. Good order.
1 " 16 in. x 16 in. x 3 ft. New.
1 " 22 in. x 20 in. x 5 ft. New.
1 " 24 in. x 24 in. x 6 ft. Hendey. New
1 " 26 in. x 26 in. x 7 ft. New.
1 " 16 in. Lever Table Drill. New.
1 Crank Planer, 16 in. x 16 in. x 13 in. New.
1 16-in. Upright Drill. New.
1 20-in. " Prentiss. New.
1 24-in. " Prentiss. New.
1 30 in. " Prentiss. New.
1 25-in. swing B. G. & S. F. Drill. Blaisdell. New
1 28-in. " " "
1 38-in. swing, B. G. & T. F. Drill. New.
1 15-in. Shaper. Gould & Eberhardt. New.
1 10-in. Shaper, Gould & Eberhardt. New,
1 15-in. Shaper. Hendey. New.
1 10-in. Shaper. Hendey. New.
1 24-in. Shaper. Hendey. Good order.
1 9-in. Shaper. Hewes & Phillips. New.
1 9-in. Shaper. New.
1 14-in. Shaper.
Full Assortment of Milling Machines, Spindle Drills, &c., of Garvin's. New. [& Lamson.
1 each Nos. 2 and 4 Screw Machines, Wire Feed. Jones
2 No. 2 Lincoln Millers. Good order.
2 No. 2 Lincoln Millers. New.
1 Hand Lathe, 12 x 4, 4 and 6 ft. New.
1 Hand Lathe, 16 in. x 6 and 7 ft. New.
1 Boring and Turning Mill, 50 in. New.
1 Boring and Turning Mill, 72 in., 2 Heads. New.
1 each 3 and 7 spindle Nut Tappers. New.
1 Gig Saw. Good as new. Rogers.
1 700-lb. Steam Hammer. Ferris & Miles. Good order New York Agency of
THE TANITE CO. and GRANT & BOGERT MACHINE TOOL WORKS,

H. PRENTISS & CO., 42 Dey St., N.Y.

For Sale.

Established 1873. Gardner Bros. "Standard Savage" Fire Brick Works, situated at Ellerslie Station, Md., on Baltimore and Ohio R. R. Also on Bedford Branch of P. R. R. Has convenient shipping arrangements on both roads. Works consist of two independent plants of machinery, so constructed and arranged that they can be run separately or together. One of the buildings entirely new, erected last year. Capacity of works, over 14,000 bricks per day. Mount Savage clay in abundance, mined on royalty, and delivered direct into works by gravity. Inclined plane and tram road, large portion of which was laid with new Tee rail last year. New artesian well, capacity over 35 barrels per hour. Also mountain stream, delivering water by gravity into tanks at works. Seven acres of land, with nine good tenements. Everything in first-class order for manufacturing and shipping brick direct from kilns into cars. Good and growing trade established. Brick unquestionably as good as the best made of Mount Savage clay. Statements of business done will be shown to responsible parties desirous of purchasing. Our good will and influence to go with sale. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

For Sale.

Established in 1864. Gardner Bros.' Gas Retort and Fire Brick Works, situated at Lockport Station, on P. R. R., 60 miles from Pittsburgh, Pa. The works consist of complete plant for manufacturing Clay Gas Retorts, Settings, Blocks, Tile and Fire Brick. Capacity, about 100 retorts, with necessary settings, and 100,000 fire brick per month. Clay and coal mined by ourselves within short distance of works and hauled in wagons. Over three acres of land, with all necessary buildings, a number of tenements and town lots. P. R. R. has side track alongside our kilns. Good trade established. Our good will and influence to go with sale. Statement of business done will be shown to responsible parties desirous of purchasing. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. Easy terms of payment are offered to suit a purchaser of limited capital. For list of Tools and further particulars apply to

WM. McILVAIN & SONS,
Manufacturers of Boiler Plate and Tank Iron,
Reading, Pa.

For Sale.

	Weight, lbs.
One Lot Old Iron Rails	10,725
do. Condemned Iron (new)	180,492
do. Large Billets	6,550
do. Small Billets	18,456
do. Cobbles	5,391
do. Short Pieces Puddle Bars	30,321
do. Finished Iron Ends	43,660
do. Tool Iron	3,996
do. Scrap Billets	18,947
do. Puddle Billets	7,622
do. Scrap Iron	105,408
do. 2½, 2¾, 3, 3¼, 4, 5 and 6 in. Scrap Bars.	
do. 2½, 3½, 4, 5 and 6 in. Puddle Bars.	

For terms and particulars apply to

JOS. J. LIPPINCOTT & CO.,
131 So. Fourth St., Philadelphia, Pa.

FOR SALE.

No. 6 Baker Blower, Nos. 4 and 6 Sturtevant Blower, No. 6 McKinzie Blower; Cupola, 48 inches; Crane, 15 tons; 2, 4, 6 and 10 H.-P. Baxter Engines; Pianer, 20 x 16 x 4 ft., $250; do., old style, 29 x 29 x 5, $200; Engine Lathe, 30 in. x 14 ft., $350, &c.

Purchases of new and second-hand machinery carefully made, at low rates, for parties out of the city.

C. R. BIGELOW, M. E.,
18 New Church St., New York City.

For Sale.

Stock of General Hardware, Stoves and Tinware, and good-will of the business without bonus. Stock will inventory thirteen to fifteen thousand. Business located in a growing town of about 9000 inhabitants, in Northwestern Pennsylvania, and a railroad center. For further information, address

"G. T."
Office of *The Iron Age*, 83 Reade St., New York.

For Sale.

A Stock of Hardware in a good location and a good trade in Omaha, Neb. The best opening in the West for Retail Hardware Business. Stock worth about $6000. Will invoice stock and give time for goods. Reason for selling, health wont permit.

Address "HARDWARE,"
Office of *The Iron Age*, 77 4th av., Pittsburgh, Pa

Trade Report.

BRITISH IRON AND METAL MARKETS.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, July 3, 1883.

Scotch Pig.—The market has improved in tone, and prices are a little firmer. Makers' prices are quoted as follows:

Coltness,	alongside,	Glasgow	59/
Langloan,	"	"	59/
Gartsherrie,	"	"	56/6
Summerlee,	"	"	57/
Carnbroe,	"	"	54/
Glengarnock,	"	Ardrossan	54/
Eglinton,	"	"	48/
Dalmellington,	"	"	48/6
Shotts,	"	at Leith	59/

Lighterage from Ardrossan to Glasgow is 1/ ₩ ton.

Cleveland Pig.—The market is a little steadier. We quote as follows, f.o.b. shipping ports:

Middlesboro'	No. 1 Foundry	43/6
"	No. 2 "	41/6
"	No. 3 "	39/6 @ 40/
"	No. 4 Forge	38/

Bessemer Pig—Is irregular. We quote W. C. Hematites 49/ @ 51/ for mixed lots, equal parts Nos. 1, 2 and 3, f.o.b. shipping ports.

Blooms.—Nothing doing.

Manufactured Iron.—The market is a little steadier. We quote at mill:

		£	s.	d.		£	s.	d.
Staff. Ord.	Marked Bars	7	10	0	@	.....		
"	Medium "	6	10	0	@	7	0	0
"	Common "	6	0	0	@	6	10	0
Hoops, 20 W. G. and over.								
"	Common Best	7	5	0	@	7	15	0
"	Medium	6	10	0	@	6	15	0
"	Common	6	5	0	@	6	10	0
Sheets, 20 W. G. and under.								
"	Ordinary Best	9	10	0	@	10	10	0
"	Common	7	10	0	@	8	0	0
Welsh Bars		5	10	0	@	5	12	6

Steel Rails—Are irregular. Ordinary Sections are quoted £4. 15/ @ £5, f.o.b. shipping ports.

Iron Rails—Dull and nominal. Welsh, 30 lb and upward, are quoted, nominally, £4. 15/ @ £5. 10/, f.o.b. shipping ports.

Old Rails—Are a little steadier. We quote Old D. H.'s, c.i.f. New York, £3. 12/6 @ £3. 15/.

Scrap.—The market is quiet and unchanged. We quote Heavy Wrought £3. 2/6 @ £3. 5/, c.i.f. New York. Bessemer Crop Ends are quoted 58/6 @ 60/6, f.o.b. shipping ports, for run of the mill.

Copper.—The market is steady at unchanged figures. Best Selected is quoted £69 @ £70, and Chili Bars, £64 @ £64. 10/.

Tin.—The market is a little firmer. Straits Ingot, spot, is quoted £94. 15/ @ £95. 15/, and futures, £95. 15/ @ £96. 15/.

Tin Plates.—The market is steady. We quote:

Tin Plates, 10 x 14,	1st qual.	Charcoal	19/6	@ 20/6
" "	2d "	"	18/6	@ 19/
" "	1st "	Coke	17/6	@ 18/
" "	2d "	"	16/	@ 16/6

Spelter—Is unchanged. Ordinary is quoted £15 @ £15. 2/6 at shipping ports.

Lead—Is unchanged. We quote Common English Pig £12. 17/6 @ £13. 2/6.

Freights.—Steam from Glasgow to New York, 7/; Liverpool to New York, 6/ @ 8/; Liverpool to Philadelphia, 7/6 @ 8/, and London to New York, 7/6 @ 9/6.

BUSINESS AND FINANCE.

Office of THE IRON AGE,
TUESDAY EVENING, July 3, 1883.

The business week closes abruptly, in deference to the national celebration of July Fourth. Although the volume of transactions is reduced, partly in consequence of pending tariff changes, and partly as a result of reaction in the speculative markets, there is apparent a better feeling. We have a stronger assurance of abundant harvests and a corresponding increase in the quantity of exportable products. There is also a probability of a more active movement in trade circles, to follow the heavy withdrawal of merchandise from bond under the new tariff, which went into full effect the 1st inst. The breaking up of the Chicago pools, it is hoped, will soon be among the things of the past, and prove to be the precursor of better times, adjusted to a more solid basis. On the other hand, we cannot fail to observe that the prices of several leading commodities have declined in foreign markets, in sympathy with our own, and that the difficulty with exporters is not so much a question of price; they simply "do not need the stuff." Moreover, an impediment arises from the increased cost of ocean transportation. As the week closes, prices for grain and flour take a wide range, and in a bearish direction. In provisions the feeling is particularly unsettled, promoted by violent fluctuations in the West. A measure of satisfaction is found in the prospect of cheaper bread at home, which may be accepted as a true index of general prosperity. It is presumed that trade in the immediate future will be governed more by the laws of supply and demand, rather than by fictitious values.

The general trade of the city has been quiet during the past week, aside from reasons above specified, on account of the process of stock taking, in which many merchants were engaged. Jobbers of all markets delayed forwarding merchandise, so far as possible, until the inventory was completed. In dry goods, while no active demand has prevailed, considerable sales are reported, with indications of a large business during the month. The money market continues very easy, with call loans at 2½ @ 3 %. We quote 60 to 90 days' indorsed bills receivable, 4 @ 5 %; four months' acceptances, 5 @ 5½. The bank return for the week is unexpectedly favorable—largely due to the return of currency from the West—there being an increase of $257,025 in surplus reserve, which now stands at $9,239,925, against $5,431,025 at the same time last year, and $6,911,300 at the corresponding date in 1881. The loans show a gain this week of $2,038,800; the specie is up $955,800; the legal tenders are decreased $402,900; the deposits other than United States are up $1,133,500, and the circulation is decreased $156,600. The banks are relatively in better condition every way than at this time last year, when large amounts of gold were leaving the country, a part of it designed to assist specie resumption in Italy. The present available supply of money is exhausted by the heavy disbursements on account of semi-annual dividends and interest due July 1st. The aggregate will probably reach $50,000,000 or upward, including about $9,500,000 from the General Government—interest on bonds.

Despite the abundance of money, the recent large additions of new securities have had a depressing effect. Since the 1st of January about 40,000,000 of securities have been listed on the New York Stock Exchange. Included are $30,250,000 St. Louis and San Francisco, $22,000,000 West Shore, $11,000,000 Buffalo, New York and Philadelphia, $52,000,000 St. Louis and Pittsburgh, $12,000,000 New York, Texas and Mexican, $24,100,000 New York, Susquehanna and Western, $10,000,000 Chicago and Northwestern, $10,574,000 St. Paul, Minneapolis and Manitoba, $11,000,000 Philadelphia and Reading, $26,800,000 Texas and St. Louis, $32,000,000 Atlantic and Pacific, $20,000,000 Galveston, Houston and San Antonio, and $55,000,000 Canada Pacific.

The exports of domestic produce from the port during the past week were below the usual average, the total being $6,241,130, against $4,940,319 for the same week last year. Since January 1 the exports amount to $176,947,824, compared with $158,555,097 for the corresponding period of 1882. The imports were of fair proportions, the total being $8,932,916, of which $6,643,579 represented general merchandise and the remainder dry goods. The entries of the leading items are less than for the previous week. Since January 1 the imports aggregate $231,285,786, compared with $253,236,329 for the corresponding period of 1882.

During the fiscal year just ended the bonded debt of the United States was reduced $134,000,000, and the interest-bearing debt $125,000,000. Over two-thirds of this reduction occurred during the first half of the fiscal year. The annual interest was diminished during the year from $71,000,000 to $59,000,000. The amount of bonds redeemed in the fiscal year 1882 was $166,000,000, which exceeds by $32,000,000 the amount redeemed in 1883. The ordinary expenditures of Government, exclusive of pensions and interest, were increased over $14,000,000 during the year just ended. This was owing to the extravagant appropriations of the last Congress. The falling off in customs receipts was $7,000,000, and in internal revenue receipts $2,000,000, and the increase of miscellaneous receipts was nearly $3,000,000. The surplus revenues were $132,000,000, as against $145,000,000 the preceding year. The amount of gold coin and gold bullion owned by the Government, exclusive of that held against outstanding certificates, declined $5,000,000, and the amount of silver dollars held in the same way increased $3,500,000 during the fiscal year.

The Stock Exchange markets are languishing, and prices are almost nominal. The reactionary feeling noticed one week ago has subsided, and opinions differ widely respecting prospects while the harvests are ripening. On Friday the Vanderbilt and Gould shares were generally strong, except Western Union, which was weak. The same general conditions prevailed on Saturday, when Western Union fell about 1 %, on the decision of Judge Freedman, who refused the injunction to restrain the payment of dividends on stock alleged to have been illegally issued. To-day transactions were on a very limited scale, but the market closed firm. The latest dealings were in Jersey Central at 85½ @ 86; Lackawanna at 128⅜ @ 128¾; St. Paul at 103⅞ @ 104⅛; Reading at 58¼ @ 58½; Union Pacific at 93⅝, 93⅞, 93¾; Wabash at 29 @ 29¼; Erie at 37 @ 37⅛; Denver at 43¼, and Long Island at 86 @ 85½. As an indication of the fictitious character of a large share of the business on the Stock Exchange, it may be mentioned that the total sales of Delaware, Lackawanna and Western during June, reckoning each share of stock at its par value, were equal to more than double the entire capital stock of the company.

Foreign exchange is dull, with few bills offering. Posted rates are $4.85½ and $4.89. Actual rates were as follows: Sixty-day, $4.84¾ @ $4.85; demand, $4.88 @ $4.88¼.

United States bonds closed as follows:

	Bid.	Asked.
U. S. 5's, 1881, continued at 3½	102½	—
U. S. 4½'s, 1891, registered	112¾	113
U. S. 4½'s, 1891, coupon	112¾	113
U. S. 4's, 1907, registered	118⅞	119⅛
U. S. 4's, 1907, coupon	118⅞	119⅛
U. S. 3 per cents	103¾	104½
U. S. Currency 6's, 1895	127	—
U. S. Currency 6's, 1896	128	—
U. S. Currency 6's, 1897	129	—
U. S. Currency 6's, 1898	130	—
U. S. Currency 6's, 1899	131	—

State bonds are neglected.

It is announced that the Stock Clearing House will open in a few days, with R. L. Edwards as manager.

MINING STOCKS.

The closing prices for mining stocks were as follows:

	Bid.	Asked.
Amie	16	...
Alice	...	3.00
Alta. Mont	2	....
Belle Isle	57	60
Bulwer	50	....
Bassick	8	10
Big Pittsburgh	....	20
Bradshaw	....	35
Caled. B H.	80	....
California	10	....
Climax	....	20
Con. Imp	....	10
Con. Va.	....	47
Chrysolite	1.15	1.20
Central Ariz	30	....
Cherokee	1	....
Dahlonega	2	....
Durango	5	....
Decatur	4	5
Eureka Con	4.50	....
East. Or	63	64
Elke Con	22	26
Gold Placer	1	....
G. Prize	10	....
Goodshaw	....	12
Gr'n Mtn	70	....
Homestake	....	15½
Hukil	4	7
Horn Silver	7	7½
Hale & Nor	...	10
Hontense	10	....
Iron Silver	2.90	3.00
Leadville Con	40	60
L. Pitts	77	90
Mexican	2.75	....
Navajo	....	3.50
N. Belle Isle	35	....
N. Cen. Coal	12.00	14.00
Ori. & Mil	13	....
Pipe Life cer	1.14½	....
Rappahannock	7	8
Robinson Con	50	54
Red Elephant	5	....
Sierra Nev.	3.50	....
Sierra Grande	1.15	1.25
Silver King	10.00	10.12½
Sutro Tun	20	22
Stormont	40	50
Parnell	....	48
So. Hite, new	....	10
Sonora Con	18	....

GENERAL HARDWARE.

In this holiday week it is not to be expected that trade should be very brisk. At this season the chief interest is generally in the changes that are taking place in prices and the consideration of the prospects of future trade. We give below an account of the principal changes which have so far taken place in prices. They are neither very numerous nor very important. As for the future, the feeling is decidedly hopeful. We find the trade unanimous in their expectation of a good fall trade.

Nails are still in good demand and short supply, and the price continues to be $3, from which price concessions are not freely given.

W. & B. Douglas, Middletown, Conn., issue a catalogue and price list, which shows the enormous variety of their goods in 300 closely filled pages. The extent of their assortment may be judged from the fact that the alphabetical index occupies seven pages. Indeed, it is almost beyond belief the number of styles that they make of the single article of Pumps, of which each one has its special advantages for some particular purpose. W. & B. Douglas are among our oldest manufacturers (established in 1832), and maintain their position at the head of their trade as being the largest, as well as the oldest, establishment of the kind in the world.

Baeder, Adamson & Co. have issued, under date of the 1st inst., the following price list, which shows a reduction of 25 cents per ream on Best Flint Paper. The discounts and the other prices remain unchanged:

		Per ream.
Flint Paper—Our best	No. 00 to 1½	$4.50
" " "	No. 2, 2½ and 3	5.00
Star Flint Paper	All numbers	3.75
Emery Paper	No. 00 to 1½	6.50
" "	No. 2	7.50
" "	No. 2½	9.50
" "	No. 3	11.50
Emery Cloth	No. 00 to 1½	18.00
" "	No. 2	20.00
" "	No. 2½	24.00
" "	No. 3	26.00
		Cts. per yard.
Extra Flint Paper, in rolls of 50 yards each	No. 00 to 1½	10
	No. 2	11
	No. 2½	12
	No. 3	13
	No. 3½	15

The Stanley Rule and Level Co. confirm their discount sheet of January 1, 1883, and prices remain unchanged on all goods of their manufacture.

The importers of Window Glass, at a meeting held at the 25th ult., adopted the following new price list of Window Glass, to take effect on the 2d inst. The discount is 70 and 10 per cent. This change is made to make the prices conform to the new tariff:

Single, per box of 50 feet.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$13.50	$11.50	$10.75	$10.25
11 x 14 to 16 x 24	14.50	13.50	12.50	11.50
18 x 22 to 20 x 30	18.50	17.00	15.50	14.00
15 x 36 to 24 x 30	20.50	18.50	16.25	
26 x 28 to 24 x 36	22.00	20.00	17.50	
26 x 36 to 26 x 44	24.00	22.00	18.50	
26 x 46 to 30 x 50	26.00	24.00	20.50	
30 x 52 to 30 x 54	27.00	25.00	21.50	
30 x 56 to 34 x 56	29.00	27.00	24.00	
34 x 58 to 34 x 60	31.00	29.00	26.00	
36 x 60 to 40 x 60	35.00	31.00	29.00	

Double, per box of 50 feet.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$17.50	$15.00	$14.00	$13.00
11 x 14 to 16 x 24	20.00	18.00	16.50	
18 x 22 to 20 x 30	24.00	22.00	20.00	
15 x 36 to 24 x 30	26.50	24.00	21.00	
26 x 28 to 24 x 36	29.00	26.00	23.00	
26 x 36 to 26 x 44	30.00	28.00	24.00	
26 x 46 to 30 x 50	33.00	31.00	27.00	
30 x 52 to 30 x 54	35.00	32.00	28.00	
30 x 56 to 34 x 56	37.00	34.00	30.00	
34 x 58 to 34 x 60	39.00	37.00	33.00	
36 x 60 to 40 x 60	43.00	40.00	37.00	

Sizes above, $15 per box extra for every 5 inches.

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the united 84 inches bracket.

Sargent & Co. state that their price for Hammock Hooks is as follows:

ON PLATE.

No. 57, Galvanized ... per doz.,	$4.25
No. 58, Tinned ... "	4.25

WITH SCREW.

No. 67, Galvanized ... per doz.,	$4.00
No. 68, Tinned ... "	4.00

Discount 75 and 10 per cent., and 10 per cent. extra for prompt cash.

Durrie & McCarty, agents for L. Coes & Co., and Graham & Haines, agents for A. G. Coes & Co., have issued a joint circular, under date of the 2d inst., in which they say: "We are instructed to quote Coes' Genuine Screw Wrenches, of either make, at 50 per cent. discount from list. 'Mechanics' Wrenches made by L. Coes & Co., and similar quality by A. G. Coes & Co., will continue to rate at 10 per cent. less than the 'Genuine.'" The quantity discount remains as heretofore.

The manufacturers of Chalk goods have adopted the following prices, which are net, to take effect on the 28th ult.:

WHITE CRAYONS.	Cents per gross.
1000 gross	8
500 "	9
100 "	10
50 "	10
Less than 50 gross	15
ASSORTED COLORS.	**Cents per gross.**
100 gross	50
50 "	60
Less than 50 gross	65
CARPENTERS' CHALK.	**Cents per gross**
75 gross, White	50
25 " "	55
Less than 25 gross, White	60
75 gross, Red	70
25 " "	75
Less than 25 gross, Red	80
75 gross, Blue	85
25 " "	90
Less than 25 gross, Blue	95

The crayons are put up in 100-gross cases, and the Carpenters' Chalk in 25-gross cases. The actual freight will be deducted, not to exceed $1 for each regular case, but in no case will there be any prepayment of freight. No charge for cases, and no allowance for cartage.

On goods for foreign countries and California the actual freight will be deducted only to the ships at Boston or New York; but Canada and Nova Scotia are not included as foreign ports.

Terms: Cash 30 days, or if paid within 10 days from date of invoice, 2 per cent. off. All bills subject to draft at three days' sight, at maturity. Prices subject to change without notice, and no guarantee given on our goods against depression of prices. Freight bill must accompany remittances in all cases.

The Henry B. Newhall Co. have been appointed general agents of the Harvey W. Peace Co., Limited, Saw manufacturers, Brooklyn, of whose goods they will hereafter carry a full line in stock here.

The Clark Mfg. Co., of Buffalo, have issued a supplement of 40 pages to their Illustrated Catalogue of 1881. This supplement begins with a condensed priced list of their Locks, Latches, Knobs, Escutcheons, &c., numerically arranged, after which follow illustrations and price lists of their new goods, among which we notice several styles of ornamental Butts in genuine bronze, polished Roman bronze and polished bronze plated; a considerable number of new styles of Locks, new styles of Knobs and other door and window furniture, among which are several patented specialties.

Matthai, Ingram & Co., Baltimore, Md., have just issued an illustrated catalogue of Tinware and House Furnishing Goods manufactured and sold by them. The whole is divided into ten sections or parts, arranged under the following heads: Patent Pieced, Japanned and Stamped Wares, Tinners' Trimmings, Planished Wares, Wire Goods, House Furnishing Goods, Iron Ware, Granite Iron Ware and Miscellaneous Goods. Their Patent Pieced and Japanned Wares have gained a reputation in all sections of the country. The Garland (Japanned Ware) Toilet Sets are extremely pretty and neatly decorated. They are made of heavy material and finished in good workmanship. These sets are painted in fawn, drab, sky blue, maroon, cardinal, vermillion, with trimmings in colors to harmonize, and ornamented with flowers, birds, &c. The "Combination" Slop Jar may be substituted for the Garland Jars at a slight advance in price. This Jar has the following advantages: When in use with the cover or shield open, it is a complete protection to the walls and carpet, as there can be no spilling or splashing in pouring, and, when closed, is entirely odorless. The section devoted to Tinware extends over 17 pages, and embraces a full line of these goods.

The Spaulding Iron Co., of Brilliant, Jefferson County, Ohio, introduce themselves to the Nail trade by the following circular:

AN OPEN LETTER.

To Dealers in Nails.—We have the pleasure of announcing that our Nail works, which have been in process of construction since last September, are approaching completion, and we expect to be making Nails in season for the fall trade. Our prime object is money making, but in its pursuit we hope to not be forgetful of our duties to our employees, our competitors, our customers, our creditors and ourselves.

It will not be our ambition to take the lead in establishing prices, but we will be contented to realize prices that may be made by other manufacturers of good reputation. We will use Pig Iron of quality best suited for making No. 1 Nails, which we will have no difficulty in procuring so long as the supply exceeds the demand. Our constant aim will be to produce first-class Nails, for the insuring of which we shall make all necessary additions and improvements in our works.

Our president, D. Spaulding, and our secretary, C. H. Spaulding, are known to a large circle of trade, through their former connection with the Jefferson Iron Works, of Steubenville, Ohio, and they are now associated, in our establishment, with a large force of the best skilled workmen in the Ohio Valley.

Our facilities for marketing our product are not surpassed by other makers of Nails in this vicinity. Hoping to be favored with your commands, which shall always receive our best attention, we are most respectfully yours,

THE SPAULDING IRON CO.

IRON.

American Pig.—The tone of the market for Pig Iron continues to improve, and especially in No. 1. There is more eagerness manifested to buy than to sell. Indeed, there is some reluctance to take orders for future delivery on the part of producers, and more disposition to forestall their requirements on the part of consumers, than has been the case at any time this season. We note the sale of 3000 tons of "Chestnut Hill," one-half 2 X and one-half Gray Forge, at $19, delivered at Hoboken; 500 tons No. 2 Thomas, $20, for season delivery; 100 tons good Lehigh brand, October delivery, $23; 100 tons, present delivery $22; 1300 tons Nos. 1 and 2 X, at $23 for No. 1 X; $22 and $21 for 2 X, for present and future delivery respectively. We quote Foundry No. 1, $22 @ $23; Foundry No. 2, $19 @ $21, and Gray Forge, $18 @ $19.

Scotch Pig.—Although there is more inquiry, the transactions during the week have not been large, but shipments have been small in proportion, so that the stock here is not increasing. The Glasgow market is somewhat stronger, and it is noticeable that shipments from Scotland, which, a short time ago, were far behind those for the corresponding period last year, have of late been gaining, and are by this time almost as great. We quote Eglinton, $21 @ $21.50 from yard; Carnbroe, $22 @ $22.50, to arrive; Glengarnock, $23 from yard; Dalmellington, $21.50 @ $22 from ship; Summerlee, $23 @ $23.50 from ship; Coltness, $23.50 @ $24, from ship; Gartsherrie, $24 from yard; Langloan, $23.50 from ship.

Steel Rails.—There is nothing of importance to report, and we continue our quotation of $38 at mill, although the last sale of which we heard was a shade under that price.

Old Rails.—This market is without change, and, in the absence of important transactions, we continue our quotation of $22 @ $23.

Bar Iron.—We are unable to report anything fresh in the Bar Iron trade. The lethargy of the past few weeks continues undisturbed, and buyers are keeping pace with their requirements by purchasing small lots whenever consumption demands it. Consumers have become so accustomed, during the past few months, to buying in such small quantities that considerable time may elapse before trade again resumes its former character. Quotations have not changed, and there is no cause from which to infer that prices will have a further decline (except that of competition), while there are indications of improvement. Manufacturers who are keeping their mills running are busy seeking buyers, and concessions are freely offered on desirable orders. Refined Iron is quoted at mill at $1.90 @ $2.10. The rise in Pig Iron has not yet reached Bar Iron, though it is expected that it will give a stronger tone to the market within a few weeks. From store, Refined Iron is quoted at $2.30 @ $2.40, and Common at $2.10 @ $2.20, the latter being nominal, as there seems to be no demand for this quality.

Scrap Iron.—The Scrap Iron market has slightly improved during the past week. Buyers are on the alert to pick up whatever offers, should there be an important upward tendency in Crude Iron. Some of them have been making inquiries and quoting prices at figures from 50¢ to $1 less than present quotations. We quote Selected Yard Scrap at $24 @ $25 and ex-ship at $22 @ $23.50.

METALS.

Copper.—This metal, in common with others, begins to be less demoralized, the impression being that by the middle of this month a better feeling will make some headway in business circles, including the metal trade, on the theory that the situation at large in this country is sound, in consequence of fair crops, and prices yet amply remunerative to the husbandman. In Europe the outlook is equally encouraging. Crops there are promising, so that the purchasing power of the masses will be about all that can be wished. Unsatisfactory as the first half of the year has been in most branches of trade, manufacture and mining, there is consequently a much less gloomy prospect before us, so far as present indications go. Copper, under these circumstances, although not active, is quite firm at 15¼¢ @ 15½¢ for Lake, with 100,000 lb sold thereat during the week, and 14¢ @ 14¼¢ for other brands. London, during the last few days, has been better. Best Selected, £70, and Chili Bars, £64. 10/. We receive from there this afternoon the ensuing cable message: "Market is steady at unchanged figures. Best Selected, £69 @ £70, and Chili Bars, £64 @ £64.10/." Manufactures may be quoted as under: Bottoms, 24¢; Braziers, 24¢; Sheathing, 22¢, and Bolt Copper, 24¢.

Tin.—An improved tone and increased liveliness are noticeable, due, in a great measure, to the firm attitude of the London market, which this morning came £94. 10/, while this afternoon we are cabled as under: "Market a little firmer. Straits Ingot, spot, £94. 15/ @ £95. 15/, and futures, £95. 15/ @ £96. 15/." The Billiton sale at Batavia last Wednesday averaged £95. 10/ cost and freight per steamer via Holland. During last month, the cable further tells us, the Straits settlements shipped to the United States 1000 tons of Tin, and to England, 350, while from Australia the latter received 700 tons. We quote, after a fair amount of sales, Straits and Malacca, on the spot, for large lines, 21¼¢ @ 21⅜¢, and Lamb and Flag, 22¢ @ 22½¢. Messrs. William I. Russell & Co., 12 Cliff street, New York, made on June 30 the visible supply of Tin on this coast 3082 tons, against 2951 last year, same time, and the price 21¼¢, against last year, same date, 22⅜¢, and 20½¢ in 1881. For *Tin Plates* the demand has been excellent. Dealers have been quite busy filling orders at 5¢ decline from our last week's quotations, but in the course of the month, after the first pressure to get plates shall have subsided somewhat, there is a chance that the purchaser will receive the full benefit of the 11¢ duty difference ℔ box, instead of only 5¢ at present. We quote at the close: Charcoal Bright, $5.82½ @ $6.20; do. Ternes, $5.07½ @ $5.32½; Coke Tin, $5.07½ @ $5.20, and do. Ternes, $4.82½ @ $4.95, all large lots, ordinary brands, ℔ box. Liverpool the last few days has been quite strong, dealers anticipating the forthcoming of copious orders from this side. They quote Coke, 16/3 @ 16/6, and Charcoal, 18/6 @ 20/. From London we are informed to-day that the market still remains steady.

Lead.—A sale is reported of 400 tons Common Domestic, effected yesterday, at $4.40, which is at the same time the closing figure, on a quiet but firm market, while Refined is worth $4.45. St. Louis remains quiet and well sustained at $4.12½ for Hard, and $4.15 for Soft, without any change in freight. From Europe we receive to-day the ensuing cable message: "Lead is unchanged. Common English Pig, £12. 17/6 @ £13. 2/6." Manufactures are quoted as follows: Lead Pipe, 6¼¢; Sheet Lead, 7½¢; Tin-lined Lead Pipe, 15¢ ℔ lb, and Block-tin Pipe, 45¢, less the usual discount to dealers.

Spelter and Zinc.—Activity in Common Domestic Spelter does not yet revive, the business done having been confined to straggling parcels at $4.50 @ $4.62½, while Silesian nominally remains 5⅛¢. From London we are wired to-day that the market remains the same as last week, viz., Ordinary, £15 @ £15. 2/6 at shipping port. We quote Bertha Refined, 7¾¢ @ 8¢, and Bergenport, 9½¢, while *Sheet Zinc* is neither active nor strong at $5.90 @ $6.

Antimony.—The demand the last few days has been slack at 9½¢ for Hallett and 10⅛¢ for Cookson.

COAL.

The first definite announcement of an advance in the prices of Anthracite Coal July 1 was made in these columns one week ago. Since that date the several companies have issued their circular. We condense as follows:

	Pa. coal.	D. L. & W.	Del. & Hud.
Lump	$3.95	$3.90	$3.90
Steamer	3.95	....	3.90
Grate	3.90	3.90	3.90
Egg	4.00	4.15	4.15
Stove	4.20	4.45	4.45
Chestnut	4.25	4.55	4.60
Pea	2.90	....	3.15

The advance by the Pennsylvania Coal Co. is 5¢ on Egg and Pea, 10¢ on Chestnut and 15¢ on Stove. The Philadelphia and Reading Coal and Iron Co. make the price of Hard White Ash at Port Richmond $4.50 for Lump and Steamboat, $3.75 for Broken, $3.90 for Egg, &c. The prices all round are supposed to be now substantially the same, making allowance for the difference in freight charges and commissions. The market is spoken of as steadily improving, with prices well sustained.

Bituminous is without change. The Pottsville *Miners' Journal* says: "The improvement previously noted in the demand for Coal for shipment East and South continues, but the line trade remains dull, as is usually the case at this time of the year, and particularly so in seasons of depression in the Iron trade. Prospects are now very encouraging for a brisk trade for the remainder of the season, footing up at the close a production largely in excess of that of any previous year of the trade."

The total amount of Anthracite Coal sent to market for the week ending June 23, as reported by the several carrying companies, was 754,659 tons, compared with 680,496 tons in the corresponding week last year, an increase of 74,163 tons.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper heavy	℔ lb.	$0.12	@	.....
" light	"	.10	@	.....
Copper Bottoms	"	.10	@	.....
Yellow Metal	"	.07½	@	.....
Brass, heavy	"	.08	@	.....
" light	"	.07	@	.....
Composition, heavy	"	.12	@	.....
Lead, heavy	"	.04	@	.....
Tea Lead	"	.03½	@	.....
Zinc	"	.03¾	@	.....
Pewter, No. 1	"	.12	@	.....
" No. 2	"	.08	@	.....
Wrought Iron	℔ ton.	22.50	@	.....
Light "	"	12.00	@	13.00
Stove Plate	"	11.50	@	12.00
Machinery "	"	14.50	@	15.00
Grate Bars	"	4.50	@	.....
Stereotype Plates	℔ lb.	.04½	@	.05
Electrotype "	"	.04¼	@	.04½
Small Type	"	.05	@	.05½

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen	℔ lb.	3½c.	@	4 c.
White Cotton, New	"	3½c.	@	.....
" No. 2	"	2½c.	@	2¾c.
White, No. 1	"	3¾c.	@	4 c.
" No. 2	"	1¾c.	@	2 c.
Seconds	"	½c.	@	1 c.
Soft Woolens	"	5 c.	@	6 c.
Mixed Rags	"	1½c.	@	1¾c.
Gunny Bagging	"	1½c.	@	.....
Jute Butts	"	1¾c.	@	.....
Kentucky Bagging	"	.....	@	3¾c.
Book Stock	"	1⅜c.	@	2 c.
Newspapers	"	1 c.	@	.....
Waste Paper and Scraps	"	½c.	@	.....
Kentucky Bale Rope	"	3½c.	@	4 c.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending July 3, 1883.

	Quan.	Val.
Dutch West Indies.		
Windlass	1	$79
Ptlm., gals	2265	256
Nails, pkgs	3	24
Clocks, pkgs	4	154
Sew. ma., cs	7	179
Dutch East Indies.		
Ptlm., gals	378,000	40,000
Bremen.		
Ag. imp., pkgs	184	1,437
Ptlm. gals	370,250	29,620
Hdw., cs	73	1,642
Ptg. press, pgs	7	200
Mach'y, pkgs	2	306
Mf. iron, pkgs	49	105
Ag. imp., pkgs	7	317
Christiania.		
Wringers, cs	20	250
Fish hooks, bx	1	50
Sew. ma., cs	3	65
Hamburg.		
W. mills, cs	8	365
Ag.imp., pkgs	68	1,399
Pumps, pkgs	2	130
Revolvers, cse	1	635
Nails, kegs	7	25
Hdw., pkgs	65	2,512
Copper, bbls	25	7,950
Mach'y, pkgs	16	1,514
Clocks, pkgs	46	2,343
Sew. ma., cs	1199	14,982
Rivets, case	1	31
Knit. ma., cs	10	835
Brass, cs	154	14,600
Amsterdam.		
Pumps, pkgs	19	1,250
Pins case	1	49
Clocks, cs	2	82
Copper, casks	18	3,600
Scales, cs	12	41
Ptlm., gals	328,659	26,700
Tin ashes, pgs	8	500
Hdw., cs	20	342
Mach'y, pkgs	1	500
Antwerp.		
Wire, pkgs	2	300
Old firearms, cs	207	2,000
Mach'y, pkgs	12	1,500
Ag. imp., pkgs	3	395
Hdw., cs	28	749
Nkl. salts, cs	2	130
Nails, bxs	16	287
Copenhagen.		
Ag. imp., pkgs	8	548
P.O. lock bxs, cse	1	70
Clocks, cs	5	277
Mach'y, pkgs	6	343
Hdw., cs	3	153
Arendal.		
Ptlm., gals	92,923	7,200
Colberg.		
Ptlm., gals	101,064	7,700
Bristol.		
Sew. ma., cs	225	4,500
Clocks, pkgs	27	774
Hull.		
Clocks, pkgs	75	1,170
Hdw., pkgs	46	942
W. wheel	1	265
S. rollers, cs	10	350
Ag. imp., pkgs	8	421
Mach'y, pkgs	4	1,193
Limerick.		
Ptlm., gals	183,436	14,904
London.		
Clocks, pkgs	171	6,710
Bell, case	1	75
Hdw., pkgs	151	6,682
Cartridges, cse	1	19
Iron safe	1	690
Mf. iron, pkgs	13	210
Tin, cs	11	234
S. rollers, cse	1	4
Pumps, pkgs	5	222
Ag. imp, pkgs	262	6,500
Sew. ma., cs	285	3,596
Scales, cs	31	740
Mach'y, pkgs	9	2,200
Metal, cask	1	280
Glasgow.		
Mach'y, pkgs	7	2,266
Ag. imp., pkgs	4	395
Iron safe	1	400
Clocks, pkgs	46	1,017
Hdw., pkgs	13	614
Bordeaux.		
Clocks, pkgs	2	107
Copper, casks	180	33,750
Cette.		
Ptlm., gals	287 352	22,485
Liverpool.		
Cutlery, cs	22	2,352
Eyelets, case	1	175
Mf. iron, pkgs	4	185
Mach'y, pkgs	31	1,396
Guns, cse	1	70
Copper, bars	160	6,207
Rifles, cs	6	1,083
Hdw., pkgs	57	2,449
Ag. imp., pkgs	118	3,050
Scales, cs	10	145
Clocks, cs	339	7,743
Saws, bxs	14	187
Pumps, pkgs	17	1,040
Copper, csks	48	7,840
S'p'dware, cs	26	812
Cop. ore, sks	290	2,500
Revolvers, cs	3	1,795
Nova Scotia.		
Mf. iron, pkgs	9	49
Sew. ma., cs	8	160
Ptlm., gals	7250	1,075
Stpdware., cs	4	83
Hdw., cs	4	198
Ag. imp., pkge	1	8
Steam pump	1	375
Boiler covrng, pkgs	10	101
Newfoundland.		
Hdw., pkgs	9	240
Mach'y, pkge	1	25
Mf. iron, pkgs	52	626
Steel, pkge	1	8
Sew. ma., cs	16	325
British West Indies.		
Ptlm., gals	31,272	3,457
Nails, kegs	26	80
Mf. iron, pkgs	36	576
Cutlery, cs	2	17
Stpdware., cs	4	42
Hdw., pkgs	37	736
Sew. ma., cs	10	122
Scales, cs	4	66
Clocks, box	1	4
Nails, bxs	2	16
Revolvers, cse	1	88
Met. shingles, cs	38	247
Ag. imp., pkgs	3	85
Yel. met., case	1	94
Malta.		
Ptlm, gals	142,130	13,000
British Guiana.		
Hdw., pkgs	36	657
Ag. imp., pkgs	9	65
Nails, kegs	4	16
Ptlm., gals	10,000	1,075
New Brunswick.		
Pig iron, tons	50	800
Havre.		
Steel dies, bx	1	720
Sew. ma., cs	30	600
Pumps, pkgs	10	975
Copper, pigs	291	15,050
Valve	1	20
Ag.imp., pkgs	71	3,987
Mach'y, pkgs	2	555
Old arms, cse	1	100
Copper, cks	180	33,750
Hdw., cs	5	137
Ptm., gals	382,844	33,291
Marseilles.		
Ag. imp., pkgs	2	154
French West Indies.		
Ptlm., gals	10,000	1,045
French Guiana.		
Ptlm., gals	1000	105
Hdw., pkgs	2	35
Bilbao.		
Ptlm., gals	148,139	11,475
Alicante.		
Ptlm., gals	171,540	16,300
Nails, kegs	4	17
Barcelona.		
Sew. ma., cse	1	40
Fiume.		
Ptlm., gals	437,122	30,600
Beyrout.		
Ptlm., gals	198,000	18,058
Cuba.		
Mf. iron, pkgs	149	2,097
Hdw., pkgs	161	2,702
Nails, kegs	12	36
Pumps, pkgs	7	235
Spikes, kegs	122	198
Ptlm., gals	650	131
Fire extnghr., pkgs	4	230
Clocks, pkgs	25	698
Tin, pigs	9	156
Mach'y, pkgs	60	3,544
Nails, pkgs	30	84
Scales, cs	5	86
Sew. ma., cs	289	2,475
Ag. imp., pkgs	24	421
Cutlery, cs	23	608
Sht. iron, bdls	5	112
Wheels and a., pairs	12	584
Locomotive	1	5,600
Iron safe	1	40
Saws, cs	2	112
Porto Rico.		
Hdw., cs	30	220
Mf. iron, pkgs	26	106
Clocks, pkgs	3	45
Steel tires	4	90
Leghorn.		
Hdw., cs	2	124
Spanish Possessions in Africa.		
Ptlm., gals	5000	512
Argentine Republic.		
Ag.imp., pkgs	1419	96,807
Hdw., pkgs	33	1,196
Scales, cs	14	327
Sew. ma. oil, cs	75	396
Pumps, pkge	1	62
Cutlery, pkgs	6	218
Clocks, pkgs	2	32
Ptlm., gals	12,000	1,148
Mach'y, pkgs	38	1,995
Cutlery, cs	2	126
Brazil.		
Sew. ma., cs	54	923
Ptlm., gals	287,300	30,944
Scales, cs	4	70
Irons, cs	40	200
Cutlery, cs	23	1,694
Hdw., pkgs	164	2,341
Clocks, pkgs	81	1,363
Tacks, bxs	14	85
Pumps, pkgs	9	288
Ag. imp., pkgs	7	146
Firearms, cse	1	123
Genoa.		
Hdw., pkgs	11	419
Carbines, cse	1	52
Ptlm., gals	45,867	3,600
Pumps, pkgs	3	75
China.		
Ptlm., gals	340,000	34,000
Central America.		
Mach'y, pkgs	5	333
Mf. iron, pkgs	289	2,931
Nails, keg	1	66
Tacks, case	1	15
Zinc, case	1	40
Hdw., pkgs	19	321
Sew. ma., cs	7	117
Scales, pkgs	2	12
Yel. metal, cs	2	100
Cutlery, cs	7	163
Ptlm., gals	668	70
Saws, case	1	87
Iron safe	1	15
Sht. iron, bdls	40	625
Spikes, kegs	3	21
United States of Colombia.		
Hdw., pkgs	48	1,240
Cutlery, pkgs	18	448
Revolvers, cs	2	425
Scales, cs	9	224
Iron safe	1	70
Guns, case	1	86
Buckles, pkge	1	38
Ptlm., gals	1438	180
Mf. iron, pkgs	102	1,588
Sew. ma., cs	67	1,462
Mach'y, pkgs	22	535
Cartridges, cs	7	100
Nails, cs	3	50
Clocks, pkgs	15	377
Ag. imp., pkgs	21	469
Shot, bags	24	284
Saws, cs	6	34
Br. goods, cs	2	348
Nails, kegs	24	76
Tin plates, cs	2	31
Smyrna.		
Ptlm., gals	174,320	16,188
Chili.		
Nails, kegs	2069	6,257
Ptlm., gals	40,000	4,525
Sawmills	6	2,700
Mf. iron, pkgs	36	186
Scales, cs	63	1,101
Pumps	17	104
Hdw., pkgs	25	1,060
Mach'y, pkgs	4	2,300
Ag. imp., pkgs	206	8,085
Bells	3	85
Constantinople.		
Ptlm., gals	183,500	16,515
Peru.		
Scales, cs	23	293
Hdw., pkgs	63	1,331
Pumps, pkgs	3	754
Ag. imp., pkgs	50	986
Sew. ma., cs	25	357
Ptlm., gals	9000	889
Mf. iron, pkgs	9	144
Cutlery, cs	11	294
Pumps, pkge	2	22
Mexico.		
Mf. iron, pkgs	293	2,781
Cutlery, case	1	30
Pumps, pkgs	26	4,735
Cartridges, cs	24	372
Cop. wire, cs	4	856
Scales, cs	26	289
Iron pipe, pgs	135	460
Spikes, kegs	20	52
Nails, pkgs	6	80
Tacks, cs	4	135
Revolvers, cs	2	217
Ptg. matrials., pkgs	15	947
Steel, bdls	14	151
Buckles, case	1	24

	Quan.	Val.
Hdw., pkgs...	56	1,581
Mach'y, pkgs.	103	3,820
Ag. imp.,pkgs	6	120
Ptlm., gals.	5400	629
Sew. ma., cs..	149	2,614
Tin plate, cs..	70	414
Per. caps, cs..	2	89
Clocks, pkgs..	52	1,352
Balls, case....	1	10
Locomotives..	4	41,616
Cop. g'ds,case	1	57
Firearms, cse.	1	335
Hayti.		
Ptlm. gals.	2878	269
Nails, kegs...	29	109
Ptlm , gals.	2000	195
Hdw., pkgs...	10	64
Sew ma., cs..	8	75
Santo Domingo.		
Cutlery, cs....	5	73
Ptlm., gals.	3470	357
Ag. imp.,pkgs	10	97
Hdw., pkgs...	7	204
Nails, kegs....	20	83
	Quan.	Val.
Mach'y, pkgs.	13	7,709
Mf. iron, pkgs	10	180
Iron, pkgs....	48	121
Sew. machnes	11	268
Venezuela.		
Mach'y, pkgs.	46	2,318
Clocks, cs.....	12	249
Hdw., pkgs...	105	984
Scales, cs.....	17	317
Sew. ma., cs..	67	1,319
Nails, bxs....	27	223
Ag. imp. pkgs	11	107
Pumps, pkgs.	1	98
Nails, cs.....	13	107
Mf. iron, pkgs	109	1,540
Saws, cs.....	2	115
Ptlm., gals.	28,670	2,983
Iron safe....	1	170
Chains, cs....	2	150
Japan.		
Ptlm., gals.	632,000	65,900
Mf. steel, case	1	20
Mf. iron,pkgs.	13	226
Clocks, cs....	314	4,230
Hdw., pkgs...	8	507

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending July 3, 1883.

Hardware.

Barbour Bros.
Mach'y, cs., 3
Boker Hermann & Co.
Hdw., cutlery and guns, cs., 75
Cazeaux H.
Arms, cs., 29
Clark Cotton Co.
Mach'y, pkgs., 275
Dejonge L. & Co.
Mach'y, cs., 2
Drexel, Morgan & Co.
Arms, cs., 6
Field Alfred & Co.
Mdse., cs., 11
Frasse P. A. & Co.
Mdse., cs., 2
Godfrey Chas J.
Arms, cs., 5
Great Western Disp. Co.
Guns, cs., 8
Hartley, & Graham,
Mdse., cs., 3
Hayward, Perry & Co.
Mach'y, pkgs., 3
Johnson John & Co.
Mach'y, pkgs., 159
Lamarche's L. Sons,
Iron nails, cks., 14
Moore's J. P. Sons,
Mdse., cs., 12
Palmer L. M.
Nails, kegs, 69
Read, Holiday & Co.
Mach'y, cs., 2
Russell & Erwin Mfg. Co.
Case, 1
Ryle W.
Mach'y, pkgs., 24
Scott P. & Co.
Arms, cs., 5
Toluidin ——,
Iron bottles, 2
Ward Alsine,
Mdse., cs., 7
Wiebusch, Hilger & Co.
Hdw., cutlery and guns, pkgs., 12
Witte John G. & Bro.
Cutlery, cs., 17
Wolf F. W.
Mach'y, case, 1
Mach'y, pkge, 1
Order,
Casks, 2
Cases, 4
Mach'y, cs, 52
Packages, 2

Iron.

Anglo-American Roofing Co.
Sheets, cs., 306
Baring Bros. & Co.
Bars, 18,621
Wire rds, bdls., 3,440
Rods, bdls., 8,000
Bond, Parsons & Co.
Sheets, bdls., 69
Brown Bros. & Co.
Swedish bars, 1,016
Swedish bars, bdls., 400
Old rails, lot
Bruckner, Evans & Co.,
Wire netting, rolls, 80
Braithwaite J.
Ore, tons, 300
Crocker Bros.
Spiegeleisen, tons, 295
Pig, cks, 158
Hill E.
Oxide, cks., 43
Iron Clad Mfg. Co.
Sheets, bxs., 265
Sheets, bdls., 27
Lee James & Co.
Pig, tons, 100
Lundberg Gust.
Bars, 17,731
Marvel Wm.
Ore, tons, 480
McIlhanney W. H.
Rails, 3814
Morton, Bliss & Co.
Rolled beams, 41
Naylor & Co.
Bessemer pig, tons, 500
Spiegel, cks., 400
Naylor, Benzon & Co.
Drawn wire, coils, 456
Stetson G. W. & Co.
Pig, tons, 100
Ward Geo. E.
Old iron, tons, 250
Western Union Telegraph Co.
Cable, Pkgs., 3
Wright Peter & Co.
Packages, 301
Wright John & Co.
Old iron, tons, 225
Order,
Pig, tons, 1,012
Bars, 1,400
Spiegel'sen, tons, 441
Swedish, bdls., 801
Old boiler tubes, pcs., 2,907
Wheels, 32
Gal. wire, coils, 280
Wire, coils, 188
Rods, bdls., 298
Gal. wire, cks., 73
Sheets, bdls., 2785
Rails, 3,601

Steel.

Baring Bros. & Co.
Wire rods, coils, 18,-905
Brown Wm.
Cases, 6
Cary & Moen,
Casks, 31
Coils, 689
Downing, Sheldon & Co.
Bars, 16
Great Western Disp. Co.
Bundles, 35
Cases, 2
Morris L. W.
Steelware, cs., 4
Morton, Bliss & Co.
Gal. wire, cks., 15
Naylor & Co.
Billets, pkgs., 38
Perkins & Choate,
Scrap, tons, 100
Strand, Sibbald & Co.
Rails, 1,620
Wagner W. F.
Bundles, 533
Bars, 97
Cases, 56
Plates, 73
Order,
Rail ends, tons, 125⅝
Bloom ends, tons, 99
Casks, 36
Bess. blooms, 260
Rods, coils., 36
Tires, 16
Rails, 986
Cases, 41

Metals.

Bond, Parsons & Co.
Black taggers, bxs., 300
Tin plates, bxs., 2350
Cordova C. de,
Lead, cks., 4
Crooks Robert & Co.
Zinc sheets, cks., 230
Cupples Samuel,
Gun caps, cs., 40
Downing, Sheldon & Co.
Gun caps, cs., 6
Dickerson, Van Dusen Co.
Tin plates, bxs., 2709
Tin and terne plates, bxs., 147
Elwell J. W. & Co.
Lead, bbls., 4
Brass, bbls., 3
Copper, pkgs., 3
Erie & Great Western Disp. Co.
Tin plates, bxs., 2163
Tin'd sheets, cs., 27
Hibbard, Spencer & Co.
Tin plates, bxs., 2155
Hoadley & Co.
Ore, pkgs., 18
Lawrence, Johnson & Co.
Old metal, bales, 14
Old metal, tcs., 9
Naylor & Co.,
Spelter, ingots, 2286
Phelps, Dodge & Co.
Tin plates, bxs., 8581
Schoverling, Daly & Gales.
Cartridges, cs., 2
Sidney, Shepard & Co.
Tin and terne plates, bxs., 545
Smith & Sons' Carpet Cleaning Co.
Mach'y, cs., 72
Ullman, Siegmund,
Metal ware, cs., 7
Ward, Geo. E.
Pewter pipe, piece, 1
Watson & Farr,
Old copper, ½ bbl.
Western Transp. Co.
Tin plates, bxs., 350
Order,
Tin plates, bxs., 27,673
Tin plates and taggers, bxs., 2804
Zinc sheets, cks., 300
Antimony, cks., 17
Tin, slabs, 1,146
Spelter, plates, 4119
Gun caps, cs., 10
Lead, pkgs , 796
Tinfoil, cs., 3
Lead ashes, cks., 14
Old zinc, cks., 18
Black taggers, bxs., 260

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements during the past week :

IMPORTS.

For the week ended June 29 :

	1881.	1882.	1883.
Total	$7,676,266	$8,963,735	$8,932,916
Prev. reported	206,900,468	$245,671,152	$221,351,240
Since Jan. 1..	$214,576,734	254,654,887	230,284,156

Included in the imports were leading articles of merchandise valued as follows :

	Pkges.	Value.
Antimony	103	$5,700
Brass goods	79	8,608
Bronzes	27	2,690
Chains and anchors	1	8
Clocks	7	303
Copper	...	308
Cutlery	273	60,811
Gas fixtures	2	1,069
Guns	30	8,995
Hardware	13	1,313
Iron, pig, tons	1,425	29,159
Iron, sheet, tons	12	972
Iron, other, tons	1,399	52,519
Isinglass	98	6,302
Machinery	282	12,837
Metal goods	940	45,205
Nails	437	3,857
Needles	19	3,397
Nickel	7	1,002
Old metal	...	30,986
Platina	1	554
Plated ware		128
Pins	4	337
Quicksilver	650	16,754
Saddlery	26	4,110
Steel	148,297	212,430
Steel blooms	292	2,013
Spelter	55,115	2,202
Silverware	11	4,725
Tin, bxs	42,503	184,583
Tin, 2,299 slabs	185,268	45,254
Wire	9,531	16,341
Zinc, lbs	55,115	2,116
Zinc oxide	54	319

The quantity of hardware and metals imported compares with previous dates as follows :

	For the week.	26 weeks of 1883.	Same time 1882.
Cutlery, pkgs	273	3,807	3,601
Hardware, pkgs	13	683	552
Iron, R. R., bars	...	6,324	74,310
Lead, pigs	...	3,637	16,544
Steel, pkgs	148,297	2,018,483	1,071,148
Tin, bxs	42,503	941,858	1,091,753
Tin slabs, lbs	185,268	10,219,816	8,794,890

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, July 2, 1883.

Business during the first half of 1883 has not been very satisfactory, on the whole, and it is probable that profits have been smaller than at any time within the past four years. The volume of business has been large, however, and the past 10 days has developed a much better feeling, so that, whatever the result may be, the immediate indications are certainly of a more favorable character than they were six months ago. The meagerness of profits has been mainly due to the shrinkage in value, but as the turning point appears to been reached, it is believed that the last half of the year will show at least some improvement on the first half. With the exception of stove founders, consumers of iron in all departments have had a demand for their products quite up to an average of the past three years. Prices have not been as satisfactory, however; neither have orders been so plentiful, and much of the work turned out has been in fulfillment of contracts taken several months ago. The number of hands employed has not varied materially, but the falling off in demand for goods caused a feeling of apprehension that things were growing worse, and that when contracts were completed very little new business would be coming in. This, as might be expected, led to the keenest kind of competition, which, with declining prices, led to a postponement of orders, and, as a natural consequence, a further confirmation of the opinion that business was not in a healthy condition. As regards the stove trade, it is belived that with a firm market for Iron buyers will come in at once and a full average business be secured before the year closes. The large machine shops report a fair business. Recently there has been a marked improvement, and the indications point to a demand which will compare favorably with that of 1882. The shipyards are employing more men than last year, the locomotive works about the same, and all through the list there is very little difference, except that prices are lower. It is impossible to predict with any certainty what may happen before the year closes, but, as we have already mentioned, the feeling is better, and beyond doubt the improvement is based on confidence in values and a healthy condition of affairs generally. The Tin Plate trade is worth mentioning in this connection. The increase in business during the past six months has been almost phenomenal. For many years Philadalphia has held a leading position in this branch of trade, and while the increase has been remarkable for the past five or six years, at no time has it been so great as within the past six months. Under these conditions there is reason to hope for a healthy business, and while profits may not be altogether what they might be, it is satisfactory to feel that there is no inflation, and therefore no danger of a collapse.

Pig Iron.—Until within the past two weeks prices have shown uniform weakness, the decline since January having been about $4 ℔ ton on Foundry Irons and $2 on Mill Irons. The reaction of the past 10 days had led to the recovery of about $1 on the first named and 50¢ on the last, the market closing strong. Sales during last week were unusually heavy, many lots of 500 to 1000 tons each having been taken and several offers to duplicate purchases having been declined. The current of feeling has been completely changed from indifference and apathy to one of lively interest. This may be simply a "spurt," but it has quickened the market wonderfully, the gain within a week being about equal to a month or six weeks' decline. Sales have been on the basis of $21 @ $22 delivered for No. 1 Foundry (Southern and Lehigh brands), and $23 @ $23.50 for special brands. No. 2 has been in better demand, and has sold fairly at $19 @ $20.50, according to character of brand. Sales of both grades have been made at less money, however, but it would be difficult to secure anything to-day of recognized standing at less than the figures above quoted. A considerable business has been done in Mill Irons at prices ranging from $17.50 up to $20, delivered, the heaviest sales having been at $18 @ $18.50 for good average qualities, the market closing firm, with a hardening tendency. The following, showing average quotations f.o.b. cars at furnace at dates named, will probably be of interest :

	July 1, 1882.	Jan., 1883.	July, 1883.
No. 1 Foundry	$25.00	$24.00	$20.00
Mill Irons	21.00	19.50	17.50

Bessemer Pig.—The past six months has been one of extreme dullness, sales having been almost *nil*. At the opening of the year $23 was asked, but prices have gradually weakened to $21, at which quotation sales have recently been made. The inactivity is due to several causes, but mainly to the fact that cheaper material is absolutely necessary to offset the decline in rails. Another reason is the increased supply of native irons at comparatively low prices, and also prospectively, in anticipation of an increased product of Pig Iron by the Steel companies, who have made extensive purchases of mining lands both in the United States and elsewhere. Spiegeleisen was sold somewhat extensively at about $33.50 for 20 %, and gradually down to $30.50, with a slightly firmer feeling to-day at about $31 asked.

Manufactured Iron.—The market for Finished Iron has been very unsatisfactory, as a whole, the demand being spasmodic and uncertain and competition for business unusually close. All descriptions have suffered a decline, averaging about 3.10¢ ℔ lb., prices at this writing being somewhat about the lowest of the entire six months. There is unquestionably a better feeling, however, and with a stronger market for raw material it is quite likely that Finished Iron will begin to show a little improvement. In fact, the feeling that prices are going to be better will do much toward bringing about that result, on the same principle that on a declining market no one buys unless absolutely compelled to do so. The weakness has not been altogether a matter of feeling; however. Some of the heaviest consumers, such as car builders, have done very little so far in 1883, neither has the demand for Tank Iron been anything like it was during 1882. During the past two weeks, however, there have been indications of improvement all around, and it begins to look as though the last half of the year would in some degree make amends for the deficiencies of the first half. Prices at dates named have been as follows :

	July 1882.	Jan. 1883.	July 1883.
Bar Iron	2.60¢	2.35¢	2.15¢
Tank Iron	3.00¢	2.50¢	2.35¢

Steel Rails.—The market has been very uneventful, and the variation in prices not important, although it has been all in one direction, namely, towards lower prices. The nominal quotation in January was $40, but sales were made in December at $38.50, and that has been the average rate during the entire six months, with an occasional concession to $38. Within the past two weeks prices have been still further shaded, and in one or two instances $37 @ $37.50 has been accepted, with additional offers of 10,000-ton lots at $36.50. Summer and fall deliveries will probably be maintained at $38, but the chances seem to be in favor of lower prices for winter and spring.

Scrap—Has presented few interesting features during the past six months, and the market during this period may be characterized as quiet, and with a tendency to lower values. At the beginning of January No. 1 Wrought Scrap was quoted at $26 @ $27, while really choice grades brought about $1 more. These figures did not vary much during January and February, but toward the end of March prices weakened from 50¢ to $1 ℔ ton, and by the end of April $25 @ $26 were quoted for extra quality. During May and June prices declined still further, and are now quoted at $24 @ $24.50 for selected lots. The following quotations ruled at dates mentioned below : July, 1882, $26 @ $27.50; January, 1883, $26 @ $27; extra quality, $28; June, 1883, $24 @ $24.50. Really choice grades have not been reported in oversupply—rather the opposite—during the past six months. Sellers have urged business considerably, but buyers have not been influenced much by concessions offered to them, and have preferred to hold off rather than buy ahead; hence transactions in most cases have been on a small scale.

CHICAGO.

Office of *The Iron Age*, 56 and 58 Clark St., CHICAGO, June 30, 1883.

Hardware.—Trade in Hardware generally is fair, with firm quotations.

Nails.—A good fair demand exists for Nails at $3.15 ℔ keg for 10d. to 60d. in small lots, with an additional 10¢ off for carload lots and 2 % for cash; some few sales are, however, reported at $3 for carload lots.

Manufactured Iron.—We have no material change to note; the demand continues fair and present quotations are firm, as follows : Bar, 2.15¢ @ 2.25¢ rates; Angle, 3¢ @ 3.2¢ rates; T Iron, 4¢ rates; Beams, 3.8¢; Channels, 4¢; Sheet Iron, 9 to 14 gauge, at 3¢ rates; 15 to 17 do., @ 3.3¢; 18 to 21 do., at 3.6¢; 22 to 24 do., at 3.8¢; 25 to 26 do., 4¢; 27 do., 4.2¢. These quotations would be shaded 1-10th to 2-10ths of a cent per pound on large lots. Norway Original Bars, 4¼¢ rates; Norway Rerolled Bars, 5¼¢ rates; Ulster, 4¼¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 8¼¢ off list; Wrought Boat Spikes, 2.9¢ rates.

Pig Iron.—While inquiry for Pig Iron of all kinds may be considered good, the orders actually placed are of a hand to-mouth character only; the market, however, indicates a firmer tone. Scotch Imported is very firm at $27 @ 28. Freights have advanced. We quote Lake Superior Charcoal, Nos. 1, 2 nnd 3, $23, and Nos. 4, 5 and 6, $24.50; Briar Hill, $25; Himrod, $23; Crane, No. 1, $25; No. 2, $24; Thomas, $24 @ $25.50; American Scotch, $22 @ $25; Du Val, No. 1, $23.50; No. 2, $22.50; Fulton Notch, No. 1, $22.50; No. 2, $21.50; Calumet, $23 @ $23.50, 4 mos.; Southern Coke, No. 1, $23; No. 2, $22.35; Low Moor, No. 1, $24; No. 2, $22.75, 4 mos.; Slippery Soft, $21 @ $22.

Steel.—A fair trade is reported in Tool Machinery and Agricultural Steel, while quotations remain unchanged : Tool, 11½¢; Machinery O. H., 5¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 6¢, and O. H. Spring, Tire and Sleigh Shoe, 5¢; Sheet, first, second and third quality, 12¢, 10½¢ and 8½¢ respectively; Crucible Plow, 6¢; Eagle Plow, 5¢; Iron Center Plow, 9¾¢, and Soft Steel Center Plow, 9¾¢; Cast Plow, 5¢; German Plow, 4½¢.

Scrap Iron.—The Scrap Iron market continues dull and weak. We quote as follows, which are dealers' purchasing prices : No. 1 Country Wrought Scrap, ℔ net ton, $17; No. 1 Cast Scrap, ℔ ton, $15; No. 1 Stove Plate Scrap, ℔ ton, $10; Machine Shop Wrought Turnings, ℔ ton, $9; Cast Iron Borings, $7; Old Plows and Plow Steel, $11; Malleable Scrap, $5.

EVERETT & POST, 156 Lake street, Chicago, report to us as follows, under date of June 30, 1883 : *Connellsville Foundry Coke.*—The demand for Connellsville Foundry coke continues good, the trade generally availing themselves of ruling low prices to stock up. Prices nominally $5 @ $5.15, according to quality and delivery. *Pig Lead.*—The past week has developed considerable firmness in pig lead, consequent upon an increased demand, principally for future delivery. Sales of some 600 tons Common and Refined have been made at parity $4.15 @ $4.17½, and 75 tons Refined latterly at $4.20.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, July 2, 1883.

The season of summer dullness is upon us in its fullness. The preparations for Fourth of July celebrations in all the large towns and cities of the section give an air of bustle and business activity. Beyond this there is nearly nothing doing in any line of trade. Production is at its lowest ebb in most lines. The Nail trade and a few exceptional articles only show any signs of life. The cool weather of the early days of the week have been succeeded by high temperature, accompanied by warm, drying breezes. Rain is needed badly in some parts of the South; crops are suffering severely.

Pig Iron.—There is nothing new or interesting in the market. Trade is confined to small lots at such prices as can be obtained, generally slightly below quotations. We quote No. 1 Foundry, $19 @ $20; No. 2 Foundry, $18 @ $19; Gray Forge, $16 @ $17; White and Mottled, $14 @ $15; Car-wheel Metal, $24 @ $26.

Ores.—We quote 50 % Brown Hematite, ℔ ton, $2 @ $2.75; Red Fossil, $2 @ $2.25, delivered at furnace.

Miscellaneous Articles.—Old Rails continue rather slow at $22. There is some demand for shipping account, but it grows lighter as the season progresses. We quote Wrought Scrap, $18 @ $22; Cast Scrap, $11 @ $14; Old Wheels, nominal, $22.

Nails.—The action of the Western Association in continuing the mills through July has so far had no depressing effect on the Southern market. We quote them steady at $3 for large bills, usual discounts for cash; 10¢ @ 15¢ higher for job lots.

Manufactured Iron.—Bar is dull at $2 for large bills, assorted sizes; A fair show of orders is reported for Track Supplies, and no change in quotations. Spikes, $2.70; Track Bolts, $3.20; Fish Plate, $2.

Coal.—We quote Fancy Lump, $3; Common, $2.50; run of mine to manufacturers, $1.75 at mills.

Coke.—The blowing out of furnaces has had but slight effect on the price of Coke, as the supply has been materially shortened. We continue to quote at $3 at furnaces; Foundry, 10¢ @ 12¢ ℔ bushel.

LOUISVILLE.

GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of June 30, 1883 : The market is steady, with a moderate demand for all grades of Hot-blast Irons. Car-wheel Irons are quiet. We quote, for cash, in round lots, as below :

FOUNDRY IRON.

No. 1 Hanging Rock Charcoal	$25.00 @ 26.00
No. 1 Southern Charcoal	21.50 @ 22.00
No. 1 Hanging Rock Stonecoal and Coke	20.50 @ 21.00
No. 1 Southern Stonecoal and Coke	20.50 @ 21.00
No. 2 " "	19.00 @ 19.50
"American Scotch"	19.00 @ 20.00
Open Silver-gray	18.00 @ 19.00
Close "	17.00 @ 18.00

MILL IRONS.

No. 1 Charcoal	20.00 @ 20.50
No. 1 Stonecoal and Coke, Neutral	18.00 @ 18.50
No. 2 " "	17.00 @ 17.50
No 1 " Cold-short	17.50 @ 18.00
No. 2 " "	16.50 @ 17.00
White and Mottled, Cold-short and Neutral	15.50 @ 16.00

CAR WHEEL IRONS.

Hanging Rock, Cold-blast	32.00 @ 35.00
" Warm-blast	25.00 @ 27.00
Alabama and Georgia, Warm and Cold-blast	27.00 @ 28.00
Central Kentucky, Cold-blast	25.00 @ 28.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 115 to 121 West Main street, report to us as follows, under date of June 30, 1883 : Bars are dull. The lull in trade predicted in event of the failure of the proposed June lockout has shown up most decidedly, and there is apparently nothing to do but to wait for future developments, which, prospectively, are not over encouraging. At the same time there is no great pushing of product on the market, principally, we think, from the conviction on the part of the manufacturers that it would do no good. The extreme low prices have led to the use of inferior stock by some mills, and Muck Iron is not up to the ordinary standard for the trade. A poor quality of Old Rails is, we think, responsible for this. Hoop and Band are in light demand. Sheet is somewhat better. The light gauges are being contracted for, deliveries running through two or three months. There is fair call also for the heavier gauges. Nails are ostensibly held up to card by the association, but instead of stopping July 1st, as was voted a short time since, the time has now been extended till July 15th, and it is evident there is an indefinite elasticity to the limit set. The mills seem bound to wait till some bad demoralization manifests itself and then, if not too late, try to correct it. We venture to predict that if the mills run full till July 15th, the present quoted price will not only not be maintained, but it will be lost past immediate recovery. *Wire.*—The Barb Wire situation is practically unchanged. The difference of opinion among the Barb Wire manufacturers as to whether further royalty should be paid, and if so, how much, leaves the market, as it has been, much unsettled. It is hard to say just where bottom is. Plain Wire is also somewhat off. With all this to face, there is prospect of a good crop of the various grains. Early vegetables have already put cash in the farmer's pocket, which was not empty before, and the purchasing power of the large consuming classes is not diminished. It seems strange that such a shrinkage in values as we are experiencing in the Iron business should occur at all while the currency is undergoing constant inflation.

ST. LOUIS.

HOFFER & Co., Pig Iron and Iron Ore Merchants, 214 Pine street, report to us as follows, under date of June 30, 1883 : The market remains in the same condition as last reported, and with little prospect for better prices in the near future. We quote :

HOT BLAST CHARCOAL IRONS.

Missouri	$20.00 @ 20.50
Southern	20.00 @ 21.00
Ohio	25.00 @ 26.00

COAL AND COKE IRONS.

Missouri	20.00 @ 20.50
Southern	18.50 @ 20.00
Ohio	20.00 @ 25.00

MILL IRONS.

Red Short	18.40 @ 20.00
Neutral	17.00 @ 18.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	21.00 @ 22.00
Southern	25.00 @ 28.00
Ohio	23.00 @ 32.00

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us t following, under date of July 2, 1883 : Business for the past week has ruled somewhat more quiet, though, as a whole, satisfactory for the season. Values continue unchanged, but shaded for desirable specifications.

Ref. Bar Iron, 1 to 6 x ⅜ to 1.. ℔ lb	2¼ @ 2.35¢
" " 1 to 4½ x 1⅛ to 1.. ℔ lb	2¼ @ 2.35¢
" " ¾ to 2, Round and Square ℔ lb	2¼ @ 2.35¢
Hoop Iron, 1½ wide and upward "	3 2-10 @ 3 3-10¢
Band Iron, from 1½ to 6 in. wide "	2 7-10 @ 2 8-10¢
Horse-shoe Iron "	3¼ @ 3½¢
Norway Nail Rods "	5¼ @ 5½¢
Black Diamond Cast Steel "	11 @ 12 ¢
Machinery Steel "	4½ @ 5 ¢
Spring Steel "	4 @ 4¼¢
Common Horse Nails "	10 @ 11 ¢
Railroad Spikes, 5½ x 9-16 "	2 6-10 @ 2 7-10¢
Perkins' Horse Shoes, ℔ keg of 100 lb	$4 37½
" Mule Shoes	5 37½

RICHMOND.

ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows, under date of July 2, 1883 : The liberal deliveries on recent orders are fast depleting furnace stocks. The firmness in No. 1 Foundry is fully maintained. We quote as below :

No. 1 Scotch Pig Iron	$23.00 @ 26.50
No. 1 Anthracite Pig Iron	21.00 @ 23.50
No. 2 " "	20.00 @ 22.00
No. 1 Virginia Coke Pig Iron	20.00 @ 22.50
No. 2 " "	19.00 @ 21.00
No. 3 " "	18.00 @ 19.00
White and Mottled	16.00 @ 17.00
Virginia C. B. Charcoal	26.00 @ 28.00
Old Dom. Nails (carload lots)	3.00 @ .....
" Refined Bar Iron (base)	2 2-10¢
Old Iron Rails	21.00 @ 22.00
Wrought Scrap, No. 1	20.00 @ 21.00
Cast Scrap, No. 1	16.00 @ 18.00
Horse Shoes (Tredegar)	4.25 @ .....
Mule " "	5.25 @ .....

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From Our Regular Correspondent.*)

LONDON, ENG., June 18, 1883.

THE OUTLOOK

does not appear to have brightened to any material extent since I last wrote, and there has been no real augmentation of the volume of business done, neither have values undergone any appreciation. In some respects, indeed, there have been a few minor alterations in the other direction, but, as a whole, the *status quo ante* may be said to be also the state of things at the time of this writing. Nevertheless, there appears to be a somewhat more sanguine tone in some quarters, and a disposition to regard the situation as having within it the germs of considerable coming prosperity. It is possible that the continued fine weather may account for this buoyancy, seeing that we have now had quite an unusual spell of warmth and no rain worthy of mention—so long, in fact, that some of the good people of these islands are beginning to be fearful of drought. As a matter of fact, we Britishers never are, but always "to be," blest in respect of atmospheric conditions. Two or three days' rain will suffice to flood all our river valleys and lowlands, owing to the rapidity with which the drainage appliances carry off the water; and, on the other hand, three or four weeks' hot weather make us afraid of a possible water famine. Improvident at one time with this most precious of fluids, we are naturally reminded of our lack of forethought just when we most need the water. Some day or other we shall probably have a proper system of national water supply, so that the villages may have their supplies as well as the large cities and towns, and all be placed on the same footing. Several most comprehensive schemes with that end in view have been prepared, and have been fully discussed by the Society of Arts and other bodies, but the matter still lies dormant, partly owing to the prosaic nature of the subject, and in part by reason of its enormous cost if carried out in a proper manner. Whether we shall be troubled with drought this summer remains to be seen. In the meantime there can be no question that some of the Birmingham and Sheffield industries are benefiting greatly by the improved prospects of the farmers. Orders for forks, scythes, sickles, reaping hooks, reaper sections, &c., are most voluminous, and tax the resources of even the largest houses. The extraordinarily heavy call for scythes and reaping hooks or sickles seems very curious in this age of mowers and reapers. It is explained, however, by the fact that reapers and mowers are still in their infancy. In scores of important agricultural districts they are yet almost unknown, while in other places they are not, and will never be, used. In Belgium, France and parts of Germany, for instance, where the system of *petite culture* obtains, the scythe will always reign supreme, simply because nobody has a patch of land sufficiently large to permit of a machine being used. These people, therefore, are not only unable to use modern agricultural appliances, but are also kept behind the age in which they live—which has always seemed to me to be a powerful argument against the wider adoption of *petite culture* in England. Again, in hilly countries machines cannot be used, from the nature of the formation of the ground. These points go some distance in explanation of the continued demand for scythes, hooks and sickles, and it is the only feasible way of clearing up the mystery, unless we fall back upon the old truism that "more candles than ever have been made and sold since the invention of gas!" However, the demand of which I have spoken does exist, and must be satisfied within the next few weeks or not at all this season. Its fulfillment is causing a welcome amount of activity in the branches it affects, and is leading to the consumption of a large quantity of steel and other materials. In a similar manner, it may be noted that the agricultural engineers are remarkably busy,

many of the best-known concerns being months in arrears with their orders. The demand is very largely on foreign and Colonial account, especially from the countries and principalities along the Danube, and the southern part of European Russia. I hear of further large orders from Russia within the past few days for the Baltic Provinces, as well as for Odessa, Rostoff, Kharkoff, Berdiansk, Nicolaieff, &c. Some of the Lincoln, &c., agricultural engineering houses have also a free and growing business in fixed engines for electric-lighting purposes. These, with improved governors, extra fly-wheel, &c., have sold well in England, but even more freely on the Continent, for India and Australasia, where gas is much dearer and worse in quality than in Great Britain. I am informed on reliable authority that two of the chief houses in this branch of the engineering industry made and sold a larger number of engines last quarter than in any previous three months of their respective business careers. The work turned out in this particular department is, I think, equal to or better than anything sent out of any of the other machine shops of the entire world. If beaten at all, it is only by the very best practice of our first locomotive works. Speaking of locomotives reminds me that the producers of that class of engines are also very fully occupied on home and foreign orders, particularly on account of France, Holland, Italy, India, Denmark, Australia, and our own lines. The marine engineering shops are naturally kept in full running order by the activity of the Northern ship-building yards, and are assured of ample employment for the remainder of this year.

THE IRON MARKET

remains dull and quiet, with scarcely any change in the values. There is plenty of evidence showing that the aggregate turnover is very large, but prices continue on a low level, and in some branches competition is extremely keen. We have more grumbling than ever in a general fashion, but a little close and quiet investigation reveals the fact that few individual concerns are really suffering from a want of work. There are those who are probably going on from week to week with no great reserve in hand, but nobody is "left," and full time is the rule, although it is a rule which has its exceptions. At Glasgow warrants had a little spurt at the beginning of the week, owing to covering operations by the bear operators, but there has since been a relapse, largely caused by an increase of the reserve stocks—for the first time these many months. The change would have been more pronounced but for the blowing out of a couple of furnaces. Makers' iron is unchanged for the most part at almost the recent quotations. At Middlesboro' matters are very quiet and values are nominal on the basis of 39/ @ 39/3 for No. 3, with other numbers *pro rata*. On the West Coast, hematite pigs are nominally the same as last week, but are really inclined to be firmer, owing to the combined effects of a smaller output, no increase in the reserve stocks last week, and much heavier shipments. Mixed numbers, however, are 50/ @ 51/, with makers' brands as given in another part of this letter. Elsewhere crude irons are not brisk in the open market, although they are in large delivery on account of old-dated contracts. In Lancashire, Staffordshire, &c., stocks are somewhat on the increase, and preparations are being made for reducing the production. Of heavy manufactured iron the make is heavy, especially as regards armor, boiler and ship plates, constructional ironwork, dockyard iron, and materials for anchors, large chains, cables, &c. All the establishments running on these classes of iron have plenty of work on their books. In ordinary merchant iron there is virtually no change, marked bars in Staffordshire being £7. 10/ ℔ ton, as before, and other sorts as per your prices. From this time up to the approaching end of the quarter (and half year) we may expect decided quietude in all kinds of merchant iron, although as things now are there is no good reason for anticipating any alteration in the "list" prices at the July quarterly meetings. The manufacturers not unnaturally declare that any reduction is wholly out of the question while wages are as they are; whereas, consumers and merchants hold out for lower figures on the ground that fuel is cheaper and second-class iron so freely pressed for sale that "marked" iron ought to be lowered. It is a little early, of course, for the discussion, but, so far as I can see, there is little or no likelihood of a change being made in either one or the other direction. In sheets rather more is being done, but values are the same. Fencing wire is dull and much cut up by German competition. One German firm alone sold 30,000 tons of wire in London last year, for use in England and export, and is now, I hear, very likely to secure a Government contract here. Steel rails are nominal at £4. 12/6 @ £5, with few new orders of moment, but ample work in hand at all the mills. Blooms are quiet, but odd inquiries are reported—from the United States, for shipments to 'Frisco, &c. Rail ends and old rails have also been sold for your side. Scrap leaf-spring steel is quiet at £4 or so ℔ ton. Heavy wrought scrap is wanted for the States in No. 1 assortments, but freights are not easy to arrange on good terms, owing to the scarcity of return cargoes. Double-sawn rail ends for rerolling purposes are dearer.

SCOTCH PIG IRON

is now quiet after a brief spurt, and reserve stocks have increased by over 2000 tons, a fact which tells against any advance in values. There are now 115 furnaces in blast in Scotland, against 108 a year ago. Shipments to date this year have been 274,247 tons, against 273,871 tons last year, while Middlesboro' importations into Scotland have increased by 13,000 tons this year. In Connal's stores the stock is 581,115 tons, against 637,372 tons a year ago. Current prices are:

			No. 1.	No. 3.
Coltness,	f.o.b.	Glasgow	60/3	53/9
Gartsherrie,	"	"	57/	53/6
Langloan,	"	"	60/	53/6
Summerlee,	"	"	58/	49/9
Carnbroe,	"	"	54/	48/6
Chapelhall,	"	"	60/	....
Monkland,	"	"	48/	46/
Clyde,	"	"	50/6	48/6
Quarter,	"	"	47/3	45/3
Calder,	"	Port-Dundas	50/	50/
Govan,	"	Broomielaw	48/	46/
Glengarnock,	"	Ardrossan	54/	47/6
Eglinton,	"	"	47/6	43/6
Dalmellingt'n,	"	"	48/3	47/3
Shots,	"	Leith	56/6	55/
Kinnell,	"	Bo'ness	....	47/
Carron (best selected), Grangemouth			57/	...

SCOTCH BAR IRON

is currently priced as under, including merchants' commission and for ordinary quality and dimensions, f.o.b. Glasgow, less 2½ % discount:

	Glasgow.	N. B. crown.	Govan.
Bars	£6 10/	£5 10/	£5 10/
Hoops	7 10/	....	.....
Nail rods	6 10/	.....	.....
Angle iron	7 10/	7 10/	7
Boiler plates	8 0/	....	.....
Ship plates	7 15/	.....	.....

Extras.—Flat, Half-Round, Oval and Half-Oval, Per ton.

			⅛"	3-16"	¼"	5-16"	⅜"	½"
5-16" wide,	×	—	90/	—	—	—		
⅜"	"	×	—	100/	80/	60/	—	—
7-16"	"	×	—	—	60/	60/	50/	20/
½"	"	×	—	60/	50/	50/	40/	—
⅝"	"	×	—	50/	40/	40/	30/	30/
¾"	"	×	60/	40/	30/	30/	20/	10/
⅞"	"	×	40/	30/	20/	20/	10/	10/
1 & 1¼"	"	×	30/	20/	10/	10/	—	—
1¼ to 6"	"	×	—	10/	—	—	—	—
6¼ to 7"	"	×	—	20/	10/	10/	10/	10/
7¼"	8"	8½"	9"		10"	11"		12"
20/	30/	40/	50/		50/	60/		60/

Round, Square and Octagon.

3¼ in. to 3¾ in.	10/	7-16 in.	5/ to 10/
4 in.	20/	⅜ in.	10/ to 20/
4¼ in.	30/	5-16 in.	20/ to 30/
4½ in.	40/	¼ in.	30/ to 40/
4¾ in.	50/	No. 4 W. G.	40/ to 50/
5 in.	60/	No. 5 W. G.	50/ to 60/
5¼ in.	70/	3-16 and No. 6	70/ to 80/
5½ in.	80/	No. 7 W. G.	90/ to 100/
5¾ in.	90/	No. 8 W. G.	110/
6 in.	100/		

MIDDLESBORO' PIG IRON

remains singularly flat, although there is a voluminous shipping business and a free local consumption. No. 3 is generally held at 39/ @ 39/6, but there is no difficulty in buying at 39/1½ @ 39/3, and occasional sales are noted at a shade below 39/, by second holders. The make is still very heavy, and is so large per furnace as to really spoil the formal restriction arrangement. G.M.B., f.o.b. at makers' wharves in Tees, net cash, less 2½ %, are quoted:

No. 1 Foundry	43/6	Mottled	38/
" 2 "	41/6	White	37/6
" 3 "	39/6	Refined Metal	55/6
" 4 "	39/	Kentledge	40/
" 4 Forge	38/6	Cinder	35/

The men at Bolckow, Vaughan & Co.'s Eston Works have resumed operations pending the outcome of an appeal to arbitration.

WEST COAST HEMATITES

are not changed, but are inclined to move somewhat in an upward direction. Buying on home account, a reduced make and large shipments have tended to strengthen the views of the smelters, but in the absence of a good export demand it is of little use anticipating any early stiffening of values. Mixed lots of Nos. 1, 2 and 3 are called 50/ @ 51/, and makers' brands are as under for ordinary lots; large parcels could be had at a little less money.

	No. 1.	No. 2.	No. 3.
Cleator	54/	53/	52/
Lonsdale	52/	51/	50/
Workington	51/6	50/6	50/
Lowther	51/6	50/6	50/
Distington	51/6	50/6	50/
Harrington	51/6	50/6	50/
Solway	51/6	50/6	50/
Maryport	51/6	50/6	50/

There are now 56 furnaces at work. Last week's shipments included 17,344 tons of hematite pigs and 7381 tons of steel rails.

THE NORTHEASTERN STEEL WORKS,

at Middlesboro, to which I made a brief reference in my last letter, have been specially erected for the purpose of basic working under the Thomas-Gilchrist patents. Mr. Thomas (whose health, by the bye, has been greatly benefited by his visits to Australia) is a director and one of the leading spirits of the concern, of which Mr. Arthur Cooper (formerly with Brown, Bayley & Dixons, of Sheffield) is the practical manager. I have been favored with the subjoined detailed description of the new works:

The works are situated in the Marshes, on land adjoining the Northeastern Railway Co.'s Marsh sidings at Middlesboro'. They occupy 22 acres of ground, which is in the form of a triangle lying with its base toward the river—the river itself being the north boundary. The general manager (Mr. Cooper), in planning the works, has contrived that the basic shop shall be at the northern end of the land, and the Bessemer shop, cogging and rail mills and finishing shop shall follow in the order named toward the south. The raw material for the lining of the vessels is taken up an incline and shot into bunkers, from which it is drawn in barrows and elevated by means of a hydraulic hoist to a hight of 34 feet, where it is charged into the basic cupolas, three in number, and there burnt. When sufficiently burnt it is drawn out at the bottom and allowed to cool on the floor and sorted. It is then loaded into barrows and taken up another hoist and shot into hoppers over the stone crushers. Passing through the crushers, it again falls into hoppers, from which it is emptied by gravitation into several other grinding and mixing machines. By means of this machinery it is mixed with a certain quantity of tar to the consistency of stiff paste. It is then considered in proper form for lining the converters and for the making of converter plugs. When the converters are lined, fire and coke are put into them until the lining is sufficiently baked. The converter shells, while being lined, are ranged under a 30-ton steam traveling crane, having a span of 45 feet, by which means they are readily handled and moved to any desired position. After being lined they are placed upon suitable carriages and taken underneath the converter stage, and are lifted into position either by means of a hydraulic jack-ram or a 60-ton steam traveling crane, as the case may be. The firm propose to work, eventually, on the direct system—that is, taking molten iron from the surrounding furnaces direct to the converter—but at present they are working cold pig only, which is, of course, bought in the Cleveland and surrounding district.

The pig-iron cupolas, three in number, are arranged so that the raw material is taken up to a hight of 21 feet by means of a 20-ton hydraulic lift, and there charged with the necessary quantity of coke and limestone. When melted the iron is drawn out on the ground floor into 12-ton ladles, and then pushed forward by means of a small locomotive to another 20-ton lift, by which it is hoisted to the converter stage level, which is 21 feet above the ground line, also on the same level as the charging stage. It is then pushed forward to the front of the converter by a small locomotive which is in waiting on the converter staging. The ladle is then tipped by means of a worm and wheel into a short spout, from which it runs into the converter. The ladle is withdrawn, the blast is put on, the vessel turned up, and the process of blowing begun. After the usual careful tests have been taken and the steel found to be sufficiently blown, it is poured into a ladle carried by a transfer crane. This crane receives from two converters, another similar crane receives from two other converters, there being four 15-ton converters in the plant. The steel in the ladle carried by the transfer crane is poured into another ladle carried by a center casting crane, which covers a pit 60 feet in diameter. This crane was specially designed for the plant by Messrs. Head & Wrightson, of Stockton, the type having been patented by Mr. Wrightson. In this pit molds of any required form are placed, and steel is then drawn off, ingot by ingot, until the ladle is exhausted. The ingot molds are removed by means of four 6-ton cranes, which are arranged round the pit, and the ingots are placed on bogies and taken to Mr. Gjers' soaking pits. After remaining in these pits about 20 minutes, they are taken out by a hydraulic crane, which lifts them on to the cogging-mill rollers. The cogging mill has rolls 36 inches diameter and 7 feet 6 inches long. The engines for driving this mill have cylinders 40 inches diameter, 5 feet stroke and geared at 2 to 1. In this mill large slabs 16 inches wide will be made; also rail blooms for export or the English trade. The bloom or slab having been brought down to the required size in the mill, is passed forward by means of life-rollers to the bloom shears, where the crop ends are cut off, and the bloom itself cut to any requisite length. The blooms, if required for export, are then placed on a skid and moved along to the outside of the mill, where they are arranged on extensive banks for inspection; but if they are to be still further manipulated, they are run down by means of life-rollers to the roughing mill. The roughing rolls are 28 inches diameter and 7 feet long, and are driven by a pair of engines having cylinders 50 inches diameter and 5 feet stroke, working direct.

The bloom here is again passed backward and forward until it reaches the desired form. On coming out of the blast hole it is directed to a train of rollers, which take it to the billet shears or the rail saw, as the case may be. If billets are being made, after being cut to requisite length, they are taken on a skid to the outside of the mill, as in hot banks, and allowed to cool. When sufficiently cooled they are removed by means of two 3-ton steam portable cranes to the cold banks, thence to the straightening machines and rail drills, and afterward to the benches, where they are inspected and loaded on trucks, which are placed in docks alongside these benches. The company have commodious sidings connected, of course, with the Northeastern Railway system. Such is a brief account of the works as they now stand, but the company have in reserve 13 acres of land for further extension.

As to the prospects of the company, although the price of steel rails is now so low as to yield little or no profit to any manufacturers except those who occupy most favorable positions, and whose machinery and labor-saving appliances are of the best and most complete description, when it is remembered that the pig iron which the Northeastern Steel Co. propose to use (in fact, have already made into excellent steel) can be produced and leave a fair profit to the pig-iron maker at several shillings a ton below the price of Cleveland forge, and from 12/ to 14/ below the cost price of hematite pig (when made under most favorable conditions), it would appear that the company have little to fear in the future, particularly as the cheap pig iron above referred to will enable them to supply finished-iron makers with homogeneous ingots, blooms and slabs of a quality capable of standing the same tests as the best Yorkshire iron, and at a price very little in excess of puddled bar. The firm will employ between 500 and 600 men.

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, June 17, 1883.—*Metals.*—Everything tends to improve general business—notably promising crop prospects—and by the greater demand springing up for metals, too, we have the most unmistakable evidence that even midsummer will show a fair trade. Although more active, metals have, nevertheless, been easier, except *Copper*. We quote the latter: Chili Bars, 163 @ 168.25 francs ℔ 100 kg.; Ingots and Slabs, 172 50; Best Selected, 176 25, and Pure Corocoro Ore, 170. *Tin.*—Banca, 260; Billiton, 255; Straits and Australian, 273.75, and English, 251.25. *Iron.*—Business in this city has been moderately active; Merchant and Flooring, 17.75 @ 18 francs ℔ 100 kg.; Corners, 19, and Sheets No. 2, 23. At the North there is some complaint of a lack of orders. An attempt is likely to be made to get on foot a combination between owners of rolling mills, so as to sustain prices. The price still obtained there for Merchant iron is 18.50. As buildings have begun to spring up in this city almost in the same ratio as last year, and as the Government agreement with the leading railroad lines will soon create a good demand for material, the situation will soon resume a more cheerful aspect among us, and the momentary dullness find a permanent relief. At Rougies Manbeuge extensive works are to be erected for the manufacture of machine tools on a vast scale. The four great railroad companies with which the Government has made a contract for the extension of the same are the Paris-Lyons-Mediterranean, the Northern, the Southern, and the Eastern. France will soon possess the most complete railway system of any country on the Continent, both from a strategetical and general point of view, and the cheapening of transportation in all directions will greatly stimulate not only agriculture and stock farming, but mining and industry, so that we doubtless approach a great period of prosperity, provided crops are good, and, fortunately, for the current year they promise to be so in an eminent degree. *Coal.*—The demand is good, so that there is no difficulty in maintaining prices of the various grades.

BELGIUM.

(*Moniteur Industriel.*)

BRUSSELS, June 18, 1883.—*Iron.*—The position of the Iron market in this country continues the reverse of cheerful, but it should be noted that during the week there has at least been a slight increase of orders. Although the latter have not yet resumed the importance that might reasonably have been looked for after two months of flatness, it is, nevertheless, a consolation to see that some pressing demand begins to manifest itself, for there is a hope that it may prove the forerunner of a genuine revival. So near midsummer, we should not, however, be too sanguine. Prices are, however, not easily sustained; concessions are expected by most buyers and, in order to start the demand once more, makers show a yielding disposition. The adjudication held the other day to furnish the Government with railroad material has, under existing circumstances, as was to be expected, shown a decline on the previous opening of tenders. Meanwhile Pig Iron is rather unsettled at 5.75 @ 5.80 francs ℔ 100 kg. for English and 6 for Athus-Halancy, Charleroi selling at 7.25; all this is Foundry, whereas Puddling Pig is weak at 5.75 @ 6 for Charleroi Best, and 4.75 @ 5.25 for do. Common. Luxembourg has in the meantime come down to 5.25 @ 5.30. In order to compete seriously with Belgian it should put down its price below 5 francs, but as long as a better price can be obtained in Germany for Pig Iron from Luxembourg, as is actually the case, there is no inducement to try to force it on our market. Merchant Iron we can quote 12.50: Beams and Corners, 13 @ 13.50, not very active, and Sheets, 17 @ 27 as a range. The English complain that at its sales by adjudication of Old Rails our Government proceeds in such a bungling manner that people bidding for foreign account get discouraged, and they say that unless some more equitable system be adopted, inspiring confidence in the impartiality of the entire proceeding, foreigners will prefer not to hand in their sealed bids in the future. *Coal.*—While Coal keeps up very well, Coke rapidly tends downward.

GERMANY.

(*Borsenhalle.*)

HAMBURG, June 19, 1883.—*Iron.*—Since the sudden collapse of the Siegen blast-furnace owners' combination the entire Iron market has become unsettled in Germany, so that with very little doing for the moment, we can only give the ensuing nominal quotations ruling at Dusseldorf, the point least unsettled at this juncture. They quote in marks ℔ ton: Prime Speigel, 64 @ 68; White Pig No. 1, 57; Luxembourg, 34.60 @ 46; Charcoal Pig, 80 @ 85; Foundry No. 1, 75; No. 2, 71, and No. 3, 62; Spanish Mudela, 80 @ 82; English Bessemer at port of shipment, 50 @ 51; Spanish Bessemer Mudela at Rotterdam, 62 @ 63; German Bessemer, 59 @ 60; Merchant, 132 @ 152; Sheets, 170 @ 215; and Rolled Wire for Wire Nails, 136 @ 140. At an adjudication of Steel Rails at Strasbourg, these ranged between 145 and 150 marks. According to the Prussian census made six months ago, mining, smelting and salines in Prussia occupied on Jan. 1, 1883, 357,754 hands, besides 2868 managers and 6089 superintendents; in the manufacture of stoneware and china, together with persons employed in quarries, 157,470, with 27,607 managers and 4292 superintendents; metal working, 222,688 operatives, 94,559 managers and 2470 superintendents; machinery, tools, instruments and apparatus of all kinds were manufactured by 99,642 operatives, 42,022 managers and 4986 superintendents; chemical industry employed 23,102 operatives, 4898 managers and 1908 superintendents; and the making of oils and varnishes, 12,816 operatives, 2075 managers and 1270 superintendents; finally, building, 440,056 operatives, 78,471 managers and 15,398 superintendents. Joint manufactories, mines and smelting works employed 2,407,571 operatives, 1,183,876 managers and 59,179 superintendents. *Metals* have been inactive and mostly weaker. We quote German Lea 1, 13.25 @ 13.50; Copper, 71 @ 68, the latter for Lake, which is 2 marks lower. Tin better at 105 @ 108; Spelter inactive at 15.25 @ 15.75.

HOLLAND.

(*Koch & Vlierboom.*)

ROTTERDAM, June 19, 1883.—*Tin.*—During the week under review the price of Billiton suddenly gave way from 56.50 to 56 guilders ℔ 50 kg., but since then greater activity has prevailed, so that toward the close Billiton is firmer at 56.25, spot, and 56 50 to arrive, while Banca, less a foot-ball of speculators, has all along been steady at 57.25 guilders.

AUSTRIA.

(*Austrian Trade Journal.*)

VIENNA, June 20, 1883.—*Iron.*—While both Pig and Merchant have been neglected during the week, and sustained with some difficulty, this has not been the case with all sorts of Structural Iron. In the Steel trade there has been the agreeable surprise that the Government has suddenly begun to buy its Steel Plates for revolving steel-clad forts at home, instead of continuing to go for them to England, as had been done prior to this change. The first order, quite a considerable one, has just been given to the Witkowitz Steel Works. All our Steel works are busy: the Galician Central Railroad Co. has just ordered 5600 tons of Steel Rails, for which the company pays 121 florins ℔ ton. Austro-Hungarians opposed to the German element in the monarchy and supremacy in running the railroads of the country, especially those of Slavonian origin, have begun to agitate the question of decentralizing railroad management and throwing the management of Government railways into each province separately, instead of the whole being directed from here. In this manner they expect to oust all German railroad officers and hands from their places in the Slavonian provinces, and substitute in their stead people from among their own immediate countrymen. As the general management was excellent, nothing good is likely to arise from a change of system so radical, yet the Government will probably be weak enough to yield, its tendency for some years past being to oblige the Slavonians in every imaginable manner. Iron and Metals are steady and unaltered, so that we do not repeat our last week's quotations.

The Standard Oil Company.—According to Pittsburgh advices the Standard Oil Company are preparing to practically withdraw all their enterprises from the City of Pittsburgh and vicinity. The company, it is understood, have removed their paraffine works to Cleveland, and will gradually remove their refineries to other points, and in fact are doing so now. Some of the Pittsburgh officials of the company refuse to affirm or deny the report, while others again state that they cannot give full information on the subject, but know that at least two Standard refineries are still running in the vicinity. The Standard Oil Company's property in Pittsburgh embraces a large tract of land, together with mammoth cooper shops, where, until recently, 1,800 men were employed, still houses, warehouses, paint shops and tanks. At one time almost the entire population of the Eighteenth Ward of Pittsburgh was dependent on the Standard Works for employment. In addition to the above the company had leasehold possession of five refineries, four of which expired some months ago. A large number of coopers employed at the shops above referred to were recently transferred to Baltimore, where they were put to work in the shops at that place. There is still, however, an immense stock of barrel material on the old property in Pittsburgh.

Rotting of Stone.—Dr. Julian, of Columbia College, comes to the following conclusions in regard to the life of stones, defining life as the period during which the stone presented a decent appearance. Coarse brownstone, best used out of the sun, from 5 to 15 years; laminated fine brownstone, from 25 to 50 years; compact fine brownstone, from one to two centuries; Nova Scotia stone will probably last from 50 to 100 years; Ohio sandstone—the best of the sandstones—100 years; Caen stone, from 35 to 40 years; coarse dolomite marble, 40 years; fine marble, 60 years; pure calcareous marble, from 50 to 100 years; granite, from 75 to 200 years, according to variety. Bluestone is as yet untried, but will prove a good building material.

Female Ironworkers In Great Britain.—The Wolverhampton (England) *Evening Star*, in referring to some observations recently made by Mr. Samuel S. Baldwin, relative to female ironworkers in British iron districts, says: "We may state that representatives of this journal have recently made diligent inquiries, have visited the 'homes' of the people and conversed with them about their work and their earnings, and have recorded their experiences, which are practically the same as those of Mr. Baldwin. We rather think, indeed, that that gentleman has overstated the gross earnings of a family of nail or chain makers. Instead of $4.50 clear weekly income, $3.50 would be nearer the mark, and the prospect for the future points to a still further reduction. Our Black Country female slaves are engaged in a hopeless struggle with machinery, the price of hand-made chain and nails naturally sinking as machinery improves. Yet, with the prejudice which is born of an hereditary connection with the trades, they cling to the forge, and appear to regard hovels as their natural homes, blacksmiths' work as a perfectly regular female employment and starvation wages as fair remuneration."

A Large Issue of Patents.—On June 5 the Yale and Towne Manufacturing Company, of Stamford, Conn., received 22 patents, 20 of these being on the application of Mr. Emery, and covering the scales, gauges and testing machines which the company are about to manufacture. This is perhaps one of the most important issues of patents in a single batch which has ever come out of the Patent Office. It is certainly so in the classes to which the patents relate. Patents were also issued simultaneously in England, France, Germany and all important European countries, as well as in the principal English Colonies, so that a world-wide market is secured for the company's products in these machines.

The Pomeroy (Ohio) *Telegraph* states that, according to the most reliable information at hand, the first blast furnace in Ohio was built in Mahoning County in 1804. In 1808 a furnace was erected four miles west of Zanesville; capacity, one ton per day. The Brush Creek Furnace was erected in 1811. The furnace was in operation in 1837. Iron making was abandoned in Adams County in 1850. In 1826 the Union Furnace, Lawrence County, was built, and in 1827 Franklin Furnace, Scioto County, was erected. Its capacity was seven tons per day. The oldest furnace in the State, prepared to make iron, is the Pine Grove, of Lawrence County. It was built in 1827, with a present annual capacity of 4,500 tons of charcoal iron. Eleven furnaces were erected in Ohio in 1854 and eleven in 1877. During the 48 years intervening between 1829 and 1877, the average erection of furnaces was about one per annum.

Mr. Henry E. Colton has been removed from the position of State Geologist of Tennessee. The opinion of the local press is that Mr. Colton has been an industrious and efficient officer, and that the only cause for his removal is that he does not affiliate politically with the party now in control of the State. Mr. Colton succeeded Colonel Killebrew in this office, and has certainly worked hard to aid the development of the mineral resources of Tennessee. His reports have been carefully prepared, and have been distinguished by the avoidance of exaggeration or misrepresentation of natural advantages—good enough to command attention on their merits. If his removal is due to political considerations, it is certainly carrying partisanship a good deal further than the interests of the State call for.

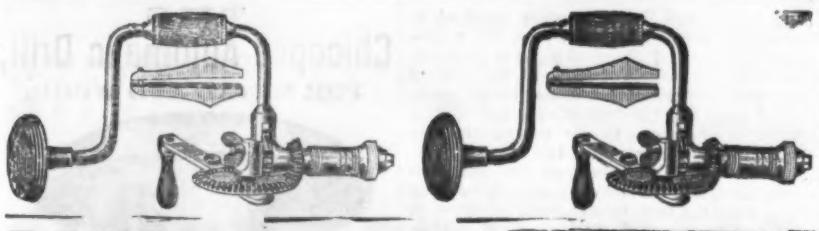
A furnace manager of practical experience in the business, who visited the Vulcan furnace at Newberry, Mich., lately, informs the Marquette *Mining Journal* that the output of pig iron from that furnace is now about 40 tons daily; also that the retorts are working quite satisfactorily, though yet better results will doubtless be had after those in charge become more familiar with the system of making charcoal. There are 50 retorts in the plant, 36 of which are running at present, and the remainder will go into operation in the course of another week or so. This furnace is one of the very best in the State, being provided with all the modern appliances, and the managers are confident of their ability to manufacture iron at a fair profit, as long as such a thing continues to be possible in this country.

An iron draw is about to be shipped from Paterson, N. J., to the Northern Pacific Railroad for a bridge over the Snake River, Oregon, which is said to be the longest and heaviest double-track draw ever built, being 345 feet long and weighing 450 tons. Another, to span the Willamette River, Oregon, is to be 390 feet long and made mostly of steel. The cost of this will be in the neighborhood of $90,000.

A contract for the delivery of 90,000 tons of coke has been awarded the Southwest Virginia Improvement Co., of Pocahontas, by the Crozer Steel and Iron Co., probably the largest contract of the kind ever made. The Crozer Furnace is now turning out 120 tons per day of the best grades of pig iron.

The Secretary of the United States Association of Charcoal Iron Workers has issued a notice to the effect that the fourth annual meeting will be held at Detroit, Mich., commencing Monday, Aug. 13, 1883.

The St. Louis Ore and Steel Co. are introducing the Gustin patent hot-bed and straightening apparatus in their rail mill. This improvement is expected to increase their product 25 per cent., and will save considerable labor.



PATENT DRILL BRACE.

This is our regular No. 32 Ratchet Brace, with a Gear Wheel added to make it take the place of a Breast Drill.

This Wheel has Cut Gears and an extension Handle. It is speeded about four to one, and can be taken off in one second when not needed for drilling.

Thus we have, in one, a Breast Drill, Ratchet Brace and Common Stationary Brace.

The Brace is made of Steel, highly polished and heavily Nickel Plated, with Cocobola Handle and Lignumvitæ Head. It has two sets of Forged Steel Jaws, which will hold square and flat shank tools of all shapes and sizes, and round twist drills from 1-32 to 7-16 inch in diameter. The ratchet attachment enables the Brace to be used in places where there is not room to revolve the sweep.

Many attempts have been made to imitate the outside appearance of our Patent Barber Improved Bit Brace, but no one dares to use our Patent Jaws, as seen in this cut, and no Brace is good without them.

We began to make these Drill Braces six months ago, but after a few thousand were put on the market we made an improvement which doubled their value. While shifting on to the improved kind, we ran out of stock, but hope in future to fill orders in a reasonable time.

We shall advertise these Drill Braces enough to make an inquiry in all Hardware Stores for them. If any dealer lays in a stock and finds that they will not sell, we will take them back at full price. But they will sell wherever shown.

We have never made a more popular tool. **Price, $36.00 per Dozen.**

Discount same as on Breast Drills. Send for Catalogue.

MILLERS FALLS CO.,

74 Chambers Street, New York.

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Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

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HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

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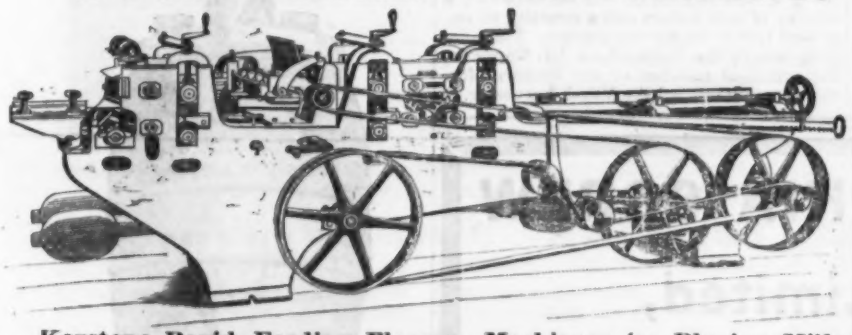
WOOD-WORKING MACHINERY.



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The POOREST CONDUCTOR of heat yet offered. CHEAP and DURABLE.

Sample and circular free by mail.

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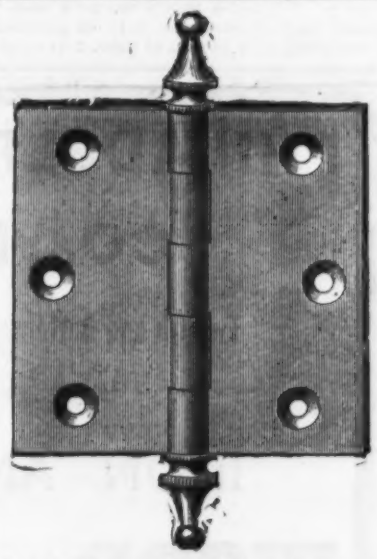

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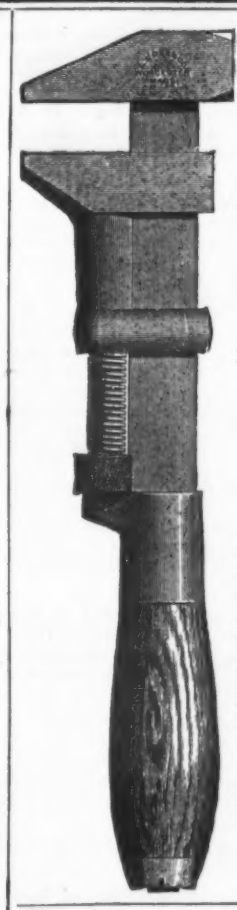

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Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.

Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

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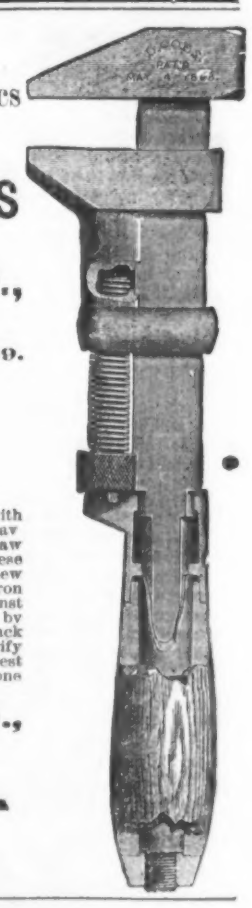

1883.

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Has no Equal, Surpassing all others, and pronounced

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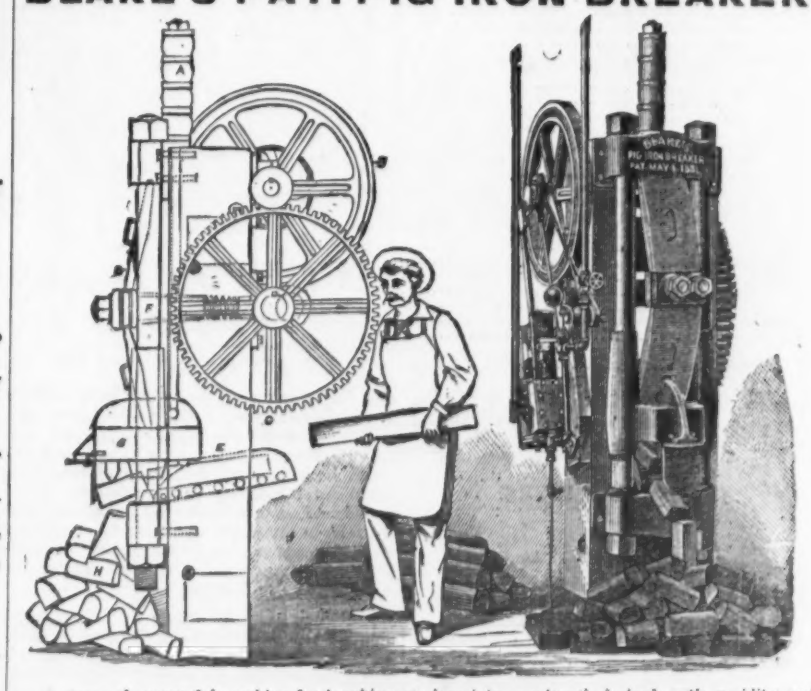
BLAKE'S PAT. PIG IRON BREAKER.



A new and successful machine for breaking pig iron into any length desired, with rapidity and economy. Besides saving in cost of breaking by hand, it secures the greatest economy in melting. Several machines already in use. Every machine guaranteed against breakage of parts. Requires but three horse-power. Can be run by belt or have small engine attached.

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The York Pat. Steel Scraper

The Lightest and Strongest Scraper made. The body is made of one single piece of steel. *The Handles are fastened inside of fold, and free from all obstructions.* The body, bail and runners are all made of steel. Especially suited for contractors. Send for circulars. Manufactured by

THE YORK MFG. CO. Limited Portsmouth, Ohio.

Failures for the Second Quarter of 1883.

The number of mercantile failures reported to *Bradstreet's* in the second quarter of the current calender year, April 1 to June 30, shows a considerable decrease as compared with the first three months of the year, but a striking increase when comparison is made with the second quarter of 1882. The average number of failures occurring each week in the first quarter of 1883 was 245; in the second quarter, 162; in the first quarter of 1882, 165; in the second quarter of 1882 the average number of failures each week was 115. As previously pointed out, January 1 being the date of balance sheets and general settlements, the number of failures in the last and first quarters of each year is uniformly larger than in the other quarters. The following table shows the failures, with assets and liabilities, for the first and second quarters of 1883:

	No.	Actual assets.	Liabilities.
First quarter	3189	$23,763,828	$42,235,535
Second quarter..	2107	16,126,760	31,560,207

The average liabilities of each failing trader for the first quarter were $13,240, and for the second quarter $14,979. The percentage of assets to liabilities for the first quarter of 1883 was 56; for the second quarter, 48. The following table shows the failures for the second quarter of 1882 and 1883:

	No.	Assets.	Liabilities.
Second quarter 1882.	1503	$12,006,174	$23,372,345
Second quarter 1883.	2107	16,126,760	31,560,207

For the second quarter of 1882, the average liabilities of such failing traders were $15,551, and the percentage of assets to liabilities, 52. The following table shows the failures for the first six months of 1882 and 1883 respectively:

	No.	Assets.	Liabilities.
1882.....	3,649	$27,329,765	$52,383,285
1883	5,296	39,829,202	73 594.205

The increase for the last six months in the number of failures is 1647, or 45 per cent. The average of liabilities for the first six months of 1882 was $14,360, and for the last six months, $13,900. The percentage of assets to liabilities for the first and second quarters of 1883, respectively, is 56 and 48; for the second quarter of 1882, 52 per cent. For the first six months of 1882 the percentage of assets to liabilities was 53, and for the first six months of 1883, 54 per cent. The failures in Canada and the Provinces for the last quarter number 337, against 409 in the first quarter of the year and 137 in the second quarter of 1882. The table showing the failures for the last six months by trades

FAILURES BY TRADES.

Divisions,	Northeastern States.	Middle States.	Southern States.	Western States.	Pacific States.	Territories.	Totals, United States.	Canada and Provinces.
Agricultural implements	1	6	6	18	.....	1	32	3
Bakers	12	20	5	20	7	.....	44	9
Banks and bankers	1	9	2	8	.....	1	21	2
Blacksmiths	1	6	1	7	2	.....	16	3
Boots and shoes	52	72	28	80	22	2	256	43
Brewers and maltsters	1	7	3	3	1	1	16	.....
Brokers	1	8	3	3	2	.....	17	1
Carpets, oil cloths, &c	2	4	2	2	1	.....	11	.....
Carpenters, builders, masons and contractors	16	9	8	10	9	.....	52	6
Carriages and wagons	2	6	7	7	.....	.....	22	.....
Clothing, clothes, &c	31	60	27	122	17	9	266	19
Coal and wood	3	10	3	14	2	.....	32	5
Cotton	1	5	12	.....	.....	.....	18	.....
Crockery, glassware, &c	7	14	13	11	4	.....	49	5
Drugs and chemicals	25	42	32	60	7	4	170	16
Dry and fancy goods	44	67	60	100	15	3	289	76
Fish, meat, &c	14	13	7	10	22	2	68	3
Florists	1	6	.....	2	1	.....	10	.....
Furniture and undertakers	11	28	10	27	5	1	84	6
General stores	74	107	403	240	71	32	933	165
Gents' furnishing	12	31	6	13	8	.....	70	9
Grain	3	2	.....	19	.....	.....	24	.....
Grocers and confectioners	121	161	180	277	38	12	799	108
Hardware, iron, steel, &c	27	46	14	77	7	6	173	24
Hats, caps and furs	8	24	7	17	1	.....	57	7
Hides, leather and harness	14	32	10	21	7	2	86	16
Hotels and restaurants	19	24	2	28	22	7	112	25
House furnishing	.....	1	1	1	.....	.....	3	.....
Liquors, wines, saloons, &c	28	40	52	69	40	12	234	17
Lumber, builders' material, &c	14	24	11	15	4	.....	68	13
Machinery	9	6	3	3	1	.....	15	3
Marble	.....	4	1	4	.....	.....	9	1
Metals	1	5	2	5	.....	.....	13	2
Millers	7	11	.....	21	.....	.....	39	6
Millinery and straw goods	7	24	58	30	10	.....	129	24
Miscellaneous	78	103	23	108	37	3	382	49
Music, musical instruments, &c	3	3	7	8	.....	1	22	.....
Oils, paints, &c	3	11	2	3	5	2	26	8
Paper, books and binders, stationery, printers, &c	23	44	22	32	4	.....	125	17
Pictures, photographers, artists' materials, &c	4	.....	.....	4	1	.....	9	2
Plumbers	2	7	3	3	1	1	19	2
Produce, provisions, fruits, &c	37	38	16	25	25	.....	141	11
Rubber goods	1	1	.....	.....	.....	.....	2	1
Tobacco and cigars	14	35	23	36	16	.....	126	19
Toys, notions, &c	3	13	10	20	.....	.....	46	1
Watches, jewelry, &c	18	38	23	31	10	2	142	14
Wood and willow ware	.....	.....	.....	3	.....	.....	3	.....
Wood	6	4	1	7	.....	.....	18	3
Totals	767	1,213	1,161	1,622	427	104	5,296	746

reveals the now familiar fact that by far the greater part of the trade disasters are among small retail dealers.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The capital of the Portsmouth Machine Co. is fixed at $130,000.

MASSACHUSETTS.

The Hopedale Machine Co. are building 100 new stocking looms for the Shaw Stocking Co., of Lowell.

It is understood that Worcester men holding valuable patents for the manufacture of wire cloth have been looking over Palmer with a view to establishing there.—*Boston Commercial Bulletin.*

At Worcester, Messrs. C. Stewart & Son are making and have orders for steel boilers from more than a dozen different places in and out of New England. They use the "Nashua" brand of steel, made at Nashua, N. H, which is stamped 60,000 pounds tensile strain, and equal to the best.

The business of the Jarvis Furnace Co. and the New England agencies of the Korting injector, Armington & Sims Co. engines, Sheffield grate bars and Schuttes & Goehring's jet instruments, will in the future be conducted by a stock company organized under the State laws of Massachusetts, with a capital of $100,000. This company will do business under the name and style of Jarvis Engineering Co. They will not only take charge of the old agencies, but they will do a general engineering and contracting business in putting in steam plants for all kinds of manufacturing purposes. Mr. K. M. Jarvis, of Boston, will be president; A. F. Upton, of Boston, treasurer and general manager. The directors will be K. M. Jarvis, A. F. Upton, L. B. Wright, Boston, Mass.; H. A. Glasier, Springfield, Mass.; F. H. Pond, St. Louis, Mo., and J. A. Grant, secretary and clerk.

The Curtis Regulator Co., of Boston, have lately received an order from the Manchester Mills for 13 Curtis steam traps. This is the third order for traps that the company have received from these mills.

CONNECTICUT.

The Yale & Towne Mfg. Co., Stamford, have received 22 patents, 20 of these being on the application of Mr. Emery, and covering the scales, gauges and testing machines which the company are about to manufacture. This is, perhaps, one of the most important issues of patents in a single batch which has ever come out of the Patent Office. It is certainly so in the classes to which the patents relate. Patents were also issued simultaneously in England, France, Germany and all important European countries, as well as in the principal English Colonies.

A new concern is to be started at Higganum, to be known as the Russell Hardware Co. The capital stock of $150,000 is mostly subscribed. It controls a number of valuable patents.

The Pratt & Cady Co., manufacturers of steam-boiler appliances, at Hartford, are building a new factory, 140 x 40 feet, and two stories high, with a brass foundry, 60 x 30. It is expected to be done in August.

PENNSYLVANIA.

Rebecca Furnace, of the Kittaning Iron Co., has been blown out.

The Wetherill Steel Casting Co., of South Chester, has been incorporated; capital, $50,000.

No new developments are apparent in the case of the Bethlehem Iron Co.'s labor difficulties.

A decision of the Court *in re* the Glen Rolling Mill Co. holds that the attaching creditors must be paid out of the funds in hand, and the balance, if any, be divided among the general creditors.

Muck bar will be made this week at the new Danville nail works.

The Elkins Mfg. and Gas Co., of 617 and ch street, Philadelphia, have issued a circular announcing that they have sold to J. G. Hendrickson, Francis J. Clamer and Frank Bushnell the right, title, good will and all interest in the Ajax metal and the trade-mark thereof. A circular of even date has been issued by the gentlemen above mentioned, announcing the purchase, and that the business will hereafter be conducted under the name of the Ajax Metal Co., with office as above named and works at 2042 to 2052 North Tenth street.

A change has taken place in the management of the stove works of Duncan & Baldwin, at Newcastle. Mr. Duncan sold his half-interest to Mr. Baldwin for $20,000 cash, and Mr. Baldwin has since sold a two-thirds interest to Senator Graham and his son at the same rate and terms.

The rolling mill of McKee, Anderson & Co., at Beaver Falls, has shut down for a month. During the vacation the manufacturing capacity will be increased fully one-fifth, new rolls put in and the entire mill put in first-class running order.

The Duncansville Rolling Mill, near Hollidaysburg, started up full time on June 28th, after a suspension of two weeks for repairs.

PITTSBURGH AND VICINITY.

The natural gas from a well in Murraysville, 19 miles from this city, is now being used as fuel under the boilers at Wilson, Walker & Co.'s rolling mill.

The Vesuvius Iron Works, at Sharpsburg, have been shut down in every department since June 1. Nearly all the men are working at other mills.

The cylinder-head of one of the large engines at Graff, Bennett & Co.'s Millvale mill blew out last week, but no one was injured. One piece of the machinery, weighing 150 pounds, was thrown over 50 feet. The breakdown caused a portion of the mill to stop.

Hubbard, Bakewell & Co., shovel manufacturers, have determined to bring suit against the city for damages, because the grade of the street by their mill has been changed, leaving their first floor 10 feet underground. They will ask the city to either raise their mill to a level with the street, or buy the mill at its appraised value.

OHIO.

The Youngstown Car Mfg. Co. was organized on June 23d, with a capital of $100,000. L. E. Cochran is president, B. F. Boyd secretary and treasurer, and Andrew Milliken general manager. The new concern takes charge of the business of the Youngstown Car Works, which has been doing a successful business there for three years.

Mr. Fayette Brown, receiver of Brown, Bonnell & Co., has filed a statement with the clerk of the United States Circuit Court, which shows the receipts and disbursements for the month of May, 1883, as follows: Balance as reported, $31,358.75; receipts in May, $185,057.08; total, $216,416.23; disbursements, $179,250.46; balance June 1, $37,165.74.

The gas excitement is spreading in Martin's Ferry, and strong efforts are being made to get a successful well.

A fire in the office and warehouse of the Crescent Iron Works, of Watson County, at Pomeroy, damaged them about $3000. The loss is covered by insurance.

Eight of the 16 boiling furnaces at the new Kelly Nail Mill, at Ironton, are completed.

The rod mill of the Cleveland Rolling Mill Co. is turning out more work at present than ever before. Over 60,000 pounds of metal are used in a day of nine hours and made into rods.

The Ohio Iron and Steel Co.'s furnace, at Lowellville, has been repaired and blown in.

C. Westlake & Co., of Warren, are running their mill double turn in both bar and muck-iron departments.

The Lane & Woodworth Glass Roofing Co., Youngstown, are producing 4 tons of roofing every day.

VIRGINIA.

The *Virginias* states that the Shenandoah Iron Co., at Milnes Station, Shenandoah Valley Railroad, have their Gem and No. 2 blast furnaces, their forge and their Fox Mountain, Kimball and Boyer iron ore mines all in steady and successful operation. At these three mines from 150 to 160 men are employed, mining over 200 tons of ore daily. Gem Furnace had a fair run in April, making 1,635 tons of pig—an average of 54.5 tons a day—about evenly divided between grades 1, 2, and 3. To make this iron, 2589 tons of coke, 3945 of ore, and 2043 of limestone were used, or 1.58 tons of coke, 2.41 of ore, and 1.25 tons of limestone were required to make one ton of pig. Furnace No. 2 produced 211 tons of charcoal pig iron in April, using 21,525 bushels of charcoal, 520 tons of ore and 100 tons of limestone, or 102 bushels of charcoal, 2.46 tons of ore, and 0.47 of a ton of limestone to the ton of pig iron made. The Forge made 120 tons of charcoal bloom. Within the past year this company have laid out about 40 acres in building lots, 50 x 150 feet in size, with avenues 70 feet and streets 25 feet wide, and more than 50 new houses, stores, &c., were erected, and more are now in course of construction. It is now proposed to supply this thriving town with water brought three miles in a pipe from the Blue Ridge, where an ample supply of pure water can be had with a head of over 300 feet. A charter has been obtained for a machine works and foundry company, which it is expected will soon begin operations.

WEST VIRGINIA.

A well being sunk for natural gas by the Central Glass Works Co., of Wheeling, at a depth of 840 feet, after piercing a thick vein of sand rock, struck a strong flow of gas. It was conducted from the mouth of the well in pipes and lighted, making a blaze 30 feet high. The gas will be used for fuel in the glass house. This is the fourth well which has been successfully drilled through to a gas vein.

MISSOURI.

Among the manufacturing establishments of St. Louis that have been compelled to shut down on account of the high river are the French Window-Glass Co., the Missouri Car and Foundry Co., the St. Louis Stamping Co., the Glendale Zinc Co., the St. Louis Ore and Steel Co., and W. Eliot Smith's glass works.

The Standard Galvanizing Co., of St. Louis, have recently completed an addition to their works, which will be used for storage purposes.

The Helmbacher Forge and Rolling Mill Co., of St. Louis, have added another hammer to their works, which makes their plant now six hammers. They have also put in a new 75-ton testing machine.

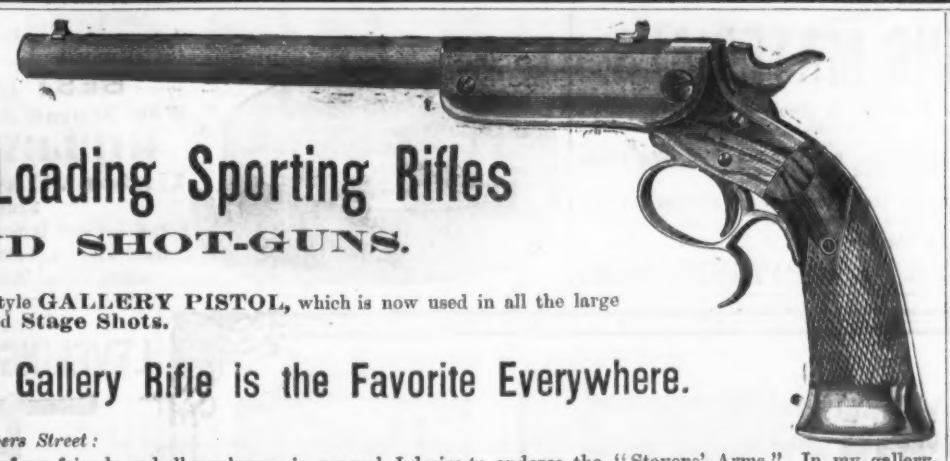
WISCONSIN.

Duluth Furnace has gone out of blast, and from the fact that the company have leased their dock to a firm of coal dealers who are now using it in their business, it may be inferred that they will hardly blow the furnace again this season.

ILLINOIS.

The Plano Mfg. Co., makers of harvesters, twine binders and mowers, at Plano, have begun a number of improvements in connection with their works. These consist of a foundry of two wings, each 120 x 60 feet in plan, a new engine of 400 horse-power, a battery of four boilers and a quantity of improved iron-working machinery. The company occupy the shops where Mr. Gammon, the principal member of the concern, formerly manufactured the Marsh harvester.

STEVENS'



Breech-Loading Sporting Rifles
AND SHOT-GUNS.

Above is a cut of our new style **GALLERY PISTOL,** which is now used in all the large **Galleries** and by all the noted **Stage Shots.**

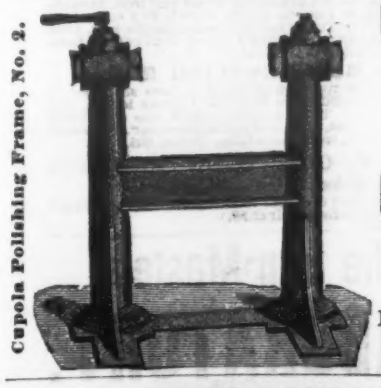
Our Shooting Gallery Rifle is the Favorite Everywhere.

Mr. Charles Folsom, 53 Chambers Street:

DEAR SIR—For the benefit of my friends and all marksmen in general, I desire to endorse the "Stevens' Arms." In my gallery, where so many tastes are to be suited, I will say that your **RIFLES** and **PISTOLS** are the favorites. They have made the best shooting on record at my place, and last, but not least, they are seldom or never out of repair. According to my ideas, which by my long experience I trust are correct, the shooting qualities of the Stevens & Co.'s Arms are as near perfection as human ingenuity and skill can make them. I take pleasure in making this voluntary contribution to your already large number of well-deserved recommendations. Yours truly, JAS. S. CONLIN, Shooting Gallery, 1222 Broadway, N. Y.

Send for New Catalogue and Discount.

J. STEVENS & CO., Box 224, CHICOPEE FALLS, MASS.



Cupola Polishing Frame, No. 2.

UNION STONE COMPANY,

38 & 40 Hawley Street, BOSTON, MASS.,

Patentees and Manufacturers OF THE

UNION EMERY WHEEL,

Emery Wheel Machinery and Tools a Specialty.

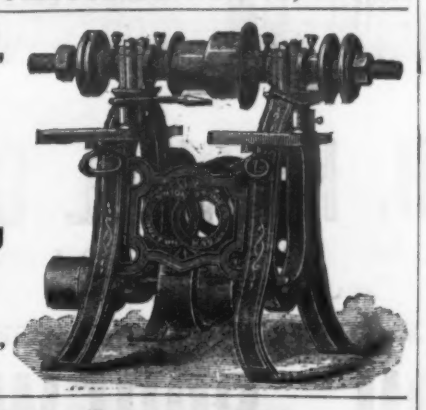
AUTOMATIC KNIFE GRINDING MACHINES.

Wood Polishing Wheels.

EMERY, QUARTZ, CORUNDUM,

GRINDERS' AND POLISHERS' SUPPLIES.

CATALOGUE ON APPLICATION.



BRIDGEPORT BOILER WORKS, Bridgeport, Conn.

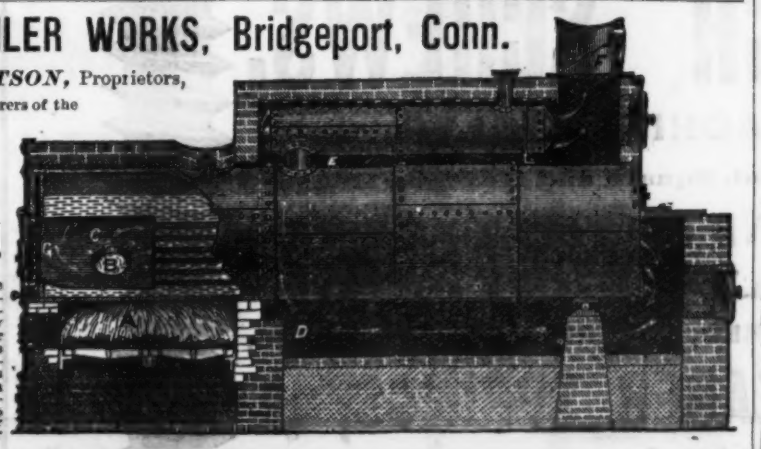
LOWE & WATSON, Proprietors,

Manufacturers of the

Lowe Patent

TUBULAR BOILER.

Fourteen years' use proves them the most desirable and reliable boiler known. Gives dry steam. The process for the combustion of the gases is in the construction and setting. Burns any fuel; obtains as much result from it as any boiler or setting, with no more cost and greater durability. ☞ Send for descriptive circular.



GAY & PARSONS'
DOUBLE ACTION RATCHET SCREW DRIVER.

ONE OF THE VERY BEST TOOLS EVER INVENTED.

It combines greater Strength, Convenience and Durability than was ever obtained in a Common Driver. Sells readily and gives Perfect Satisfaction.

TRADE SUPPLIED BY THE PRINCIPAL JOBBERS THROUGHOUT THE U. S.

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Send for Price List.

G. A. CROSBY & CO.,

259 & 261 Randolph St.,

CHICAGO, ILL.,

Manufacturers of all kinds of

Power, Screw, Hand, Foot and Drop

PRESSES,

DIES,

And Special Tools for Tin Can Makers and Sheet Metal Workers.

Send for Catalogue and Price List.

20,000 Sold the Second Year.

THE BEST ADJUSTABLE BAG HOLDER In the World.

PRICE ONLY $1.50.

Sent free, on receipt of the price, anywhere in the United States.

Just the thing for the Farmer, Thresher, Miller, the Feed Store Grain, Potato, Guano and Phosphate dealers, Postmasters and Publishers, and to all others who use Sacks or Bags it is indispensable. A perfect and simple device, made of iron, and will last a life time Sold by the Hardware trade everywhere. Orders solicited. The platform is extra if wanted Agents wanted every where. Address

L. JEFF. SPRENGLE
Sole Manufacturer,
Ashland, Ohio.

None can do without it for $1.50. Send for a circular. Special discount to the trade.

Will furnish a sample dozen to the trade during the month of January at the low price of $9.

Established 1855. **KEYSTONE WORKS.** *Centennial Award 1876.*

GEORGE GRIFFITHS,

MANUFACTURER OF

PATENT SOLID CAST STEEL

Shovels, Spades and Scoops.

Also COAL HODS, &c.

Nos. 511, 513 and 515 LOCUST ST.,

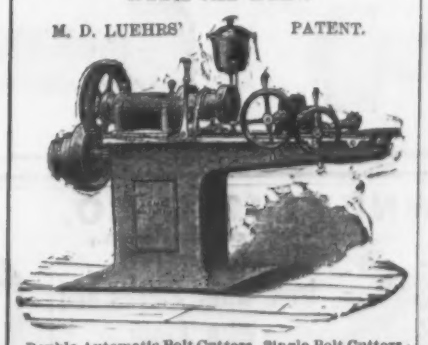
PHILADELPHIA, PA., U. S. A.

Send for Price List.

"ACME" BOLT CUTTERS

WITH CAP DIES.

M. D. LUEHRS' PATENT.



Double Automatic Bolt Cutters. Single Bolt Cutters, ¼ in. to 4 in. Rapid Bolt Cutters. Nut Tappers, ½ in. to 1¼ in. Rapid Nut Tappers, ¾ and 5 Spindles. Bolt Headers, four different styles. Bolt Pointers. Nut Presses, &c.

NOVELTY IRON WORKS

CLEVELAND, OHIO.

LEWIS'S PATENT BELT PROTECTOR

is meeting with a demand entirely beyond all anticipation. The following, however, tells the story of its signal success:

ALBANY ELECTRIC ILLUMINATING CO., ALBANY, April 21, 1883.

Mr. E. S. LEWIS:

Sir.—We are now using your BELT PROTECTORS on several of our belts, and as they give perfect satisfaction, I intend applying them as occasion may require.

Yours, &c., E. A. MAHAR, General Manager.

FOUNDRY FACINGS AND FOUNDERS' SUPPLIES,
ALBANY, N. Y., March 31, 1883.

Mr. EDWARD S. LEWIS:

Dear Sir.—It affords us great pleasure to state that your "BELT PROTECTORS," which were applied to the belts in our mill last fall, have been the means of saving us considerable expense, inasmuch as we should have been compelled to replace them at considerable outlay, whereas now they are in as good condition as when put in, with every prospect of remaining so for a long time to come. E. D. RANSOM & CO.

NEW YORK DEPOT AND AGENCY: **DEWEY MFG. CO., 29 Chambers St.**

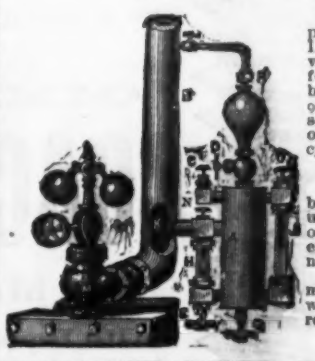
SOLE MANUFACTURER AND PROPRIETOR,

EDWARD S. LEWIS,

16 Herkimer Street, ALBANY, N. Y.

THE DETROIT LUBRICATOR COMPANY'S

SIGHT FEED LUBRICATOR CUPS,



For oiling valves and cylinders of steam engines by the only perfect method, THROUGH THE STEAM PIPE. The oil passes IN SIGHT, drop by drop, into the column of steam, where it vaporizes, thus becoming a STEAM LUBRICANT, oiling perfectly every part reached by the steam. Any CLEAN OIL, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty days' trial if desired. In ordering, give diameter of cylinder.

NOTICE.

The first Lubricators ever made showing the oil passing drop by drop through a transparent water chamber were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us, which have been sustained in several hotly-contested legal contests. Our customers therefore need have **NO fears in their purchase and use.**

Lubricators of every nature embodying the above feature made by other parties are encroachments upon our rights, and we will hold purchasers and users, as well as manufacturers, responsible in damages for such violation.

Address,

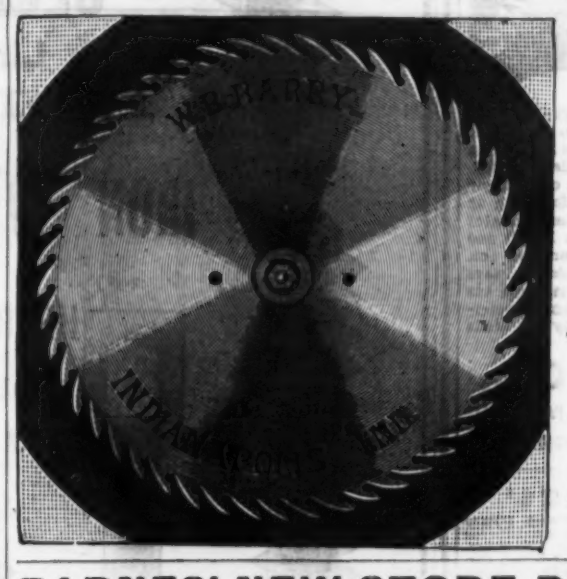
DETROIT LUBRICATOR CO.,

129 Griswold Street, DETROIT, MICH.

NOTE.—In our suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "Sight-feed" feature, a decree was rendered in our favor August 20, 1881.

Mention *The Iron Age.*

HOOSIER SAW WORKS.



W. B. BARRY,

Saw Manufacturer,

132 & 134

South Pennsylvania St.,

INDIANAPOLIS, IND

Swages, Gummers, Files, Belting and Emery Wheels.

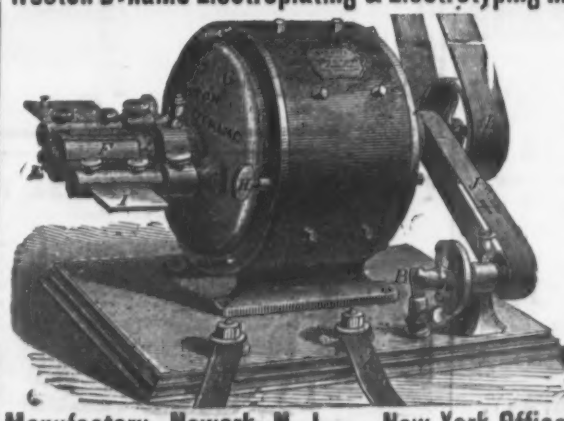
ALL WORK FULLY WARRANTED.

BARNES' NEW STORE DOOR LOCK.

H. F. SISE, Agent, 100 Chambers St., New York.

HANSON, VAN WINKLE & CO., Sole Agents for

Weston Dynamo Electroplating & Electrotyping Machines, Newark N. J.



For Nickel, Bronze, Brass, Copper and Silver Plating.

Over 1000 machines in use.

Are used by all leading stove manufacturers.

Experienced men sent to put up machines and instruct purchasers.

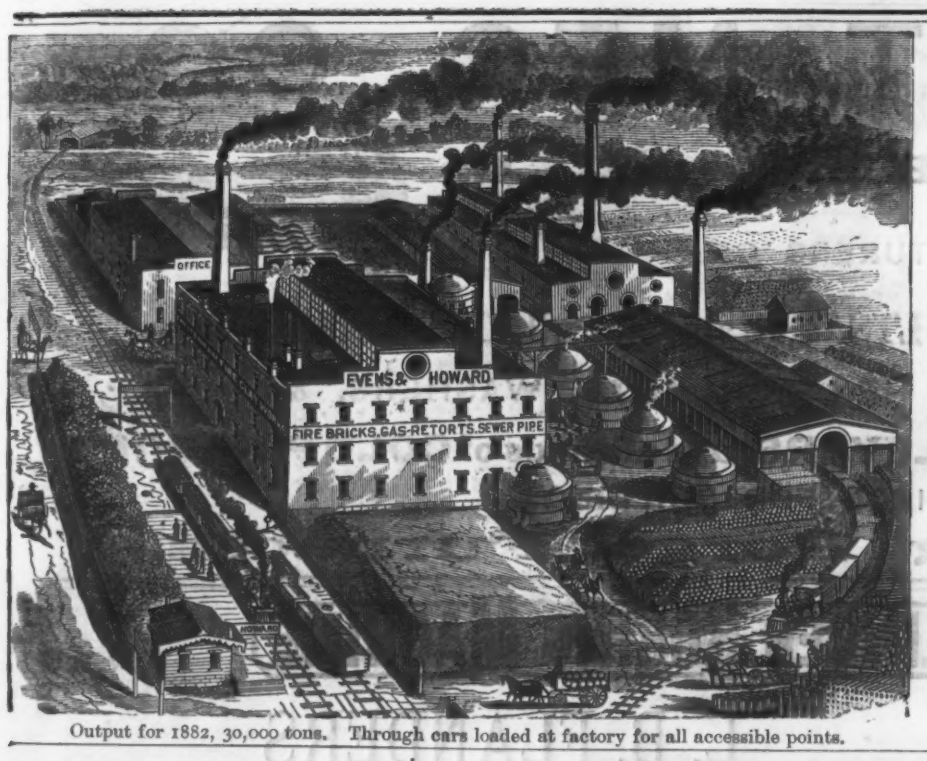
INFRINGEMENTS.

We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

MANUFACTURERS OF

Cast Nickel Anodes, Pure Nickel Salts, Polishing Materials.

Manufactory, Newark, N. J. New York Office, 92 & 94 Liberty St.



Output for 1882, 30,000 tons. Through cars loaded at factory for all accessible points.

FIRE BRICK, GAS RETORTS,

CUPOLA AND FURNACE LININGS,

Locomotive Tile, all kinds of Fire Clay Goods

AND

DOUBLE STRENGTH CULVERT PIPE.

EVENS & HOWARD,

916 MARKET STREET, St. Louis, Mo.

Send for Prices and Freight Rates.

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HORIZONTAL PRESSES

For Bending Iron. Gang Boring Machines, Tools for Plow Makers. The Justice Hammer.

Send for Circulars.

Drop Press.

HENDERSON'S

DOME FURNACE.

The Dome is cast in one piece and has no joints. It is the best and cheapest Furnace made.

This Portable Furnace

IS MADE TO BE

TIGHT without CEMENT,

and is easily put up for use, and can be set in any kind of place; being made of

ALL CAST IRON,

it is not liable to get out of repair or leak gas.

THE FIRE-POT & GRATE ARE LARGE,

which insures its working every time with LITTLE TROUBLE OR CARE. The Grates are made plain or clinkerless, as most desirable. The radiating surfaces being large, makes it a very

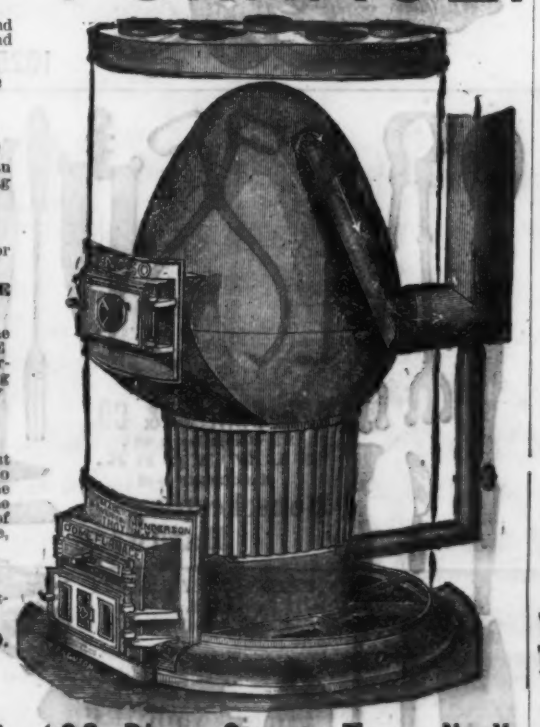
POWERFUL HEATER.

They have a check draft and dust damper attached to the ash-pit, to better regulate them. They are the cheapest first-class furnace on the market. They will heat any kind of building, either public or private, economically and well.

Four Sizes are Made,

and can be set in either brick or portable form.

No. 40, No. 50, No. 60, No. 70.



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J. C. HENDERSON, 193 River Street, Troy, N. Y.

Send for Price List and References, if needed.

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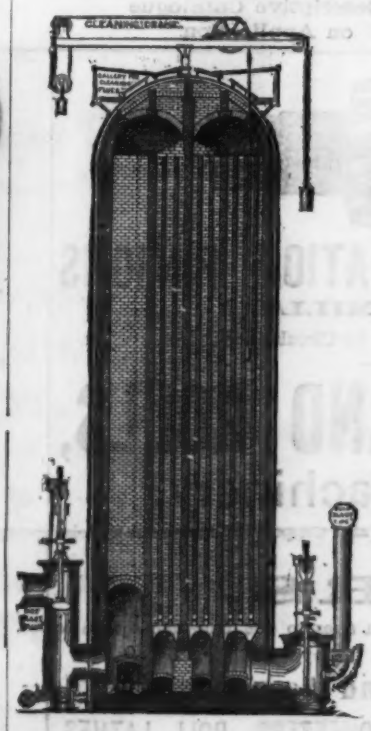
ENGINEERS.



Whitwell Fire-Brick

HOT-BLAST STOVES

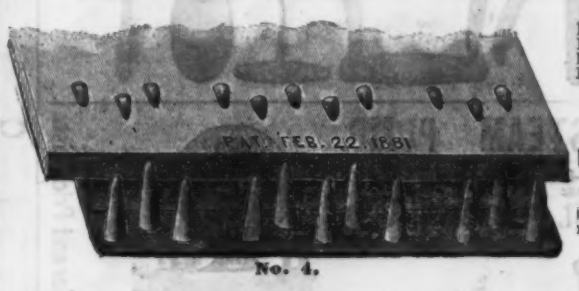
Contract for erecting the same. Also, for Building and Replacing all types of Blast Furnaces. Combining Economy with Efficiency and Modern Improvements, wherein the output of Furnaces is increased fully 50 per cent. and the fuel consumption decreased in the same ratio.

Our Blast Engines, Hoisting Engines, &c., have no superior in strength of parts, duty or economy. We solicit an opportunity to make proposals on Blast Furnaces, Rolling Mill or Steel Works Machinery.

Main Office, 86 Water St., Pittsburgh, Pa.

WORKS, NEW CASTLE, PA.

A WORLD BEATER,



No. 4.

Because there is no other Belt Fastener on earth that can hold a candle alongside of it. It is

CHEAPER,
STRONGER,
MORE DURABLE,
EASIER ADJUSTED

than any other Belt Fastener made. It makes a

CONTINUOUS BELT.

THACHER'S PATENT BELT FASTENER.

ONCE USED, ALWAYS USED.

It's a running Advertisement of Itself. A Sample by Mail Free.

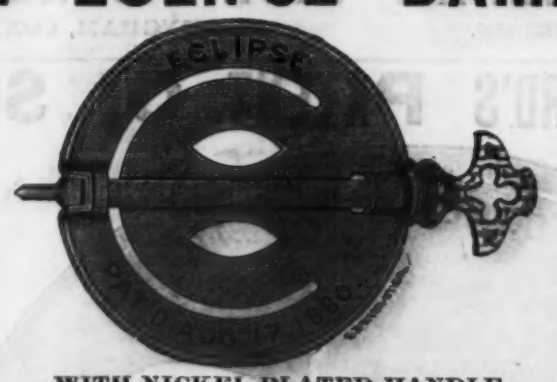
THACHER & CO., Cleveland, O.

"BEST OF ALL."

THE ECLIPSE DAMPER.

Preferred by Jobbers.

Packed three dozen in a case.



Dealers Will Buy No Others AFTER ONE TRIAL.

Finest Goods. Smoothest Castings.

WITH NICKEL PLATED HANDLE.

The Easiest Selling Damper. Most Attractive to Customers.

Insist upon your Jobber sending you this Damper only.

PRICE LIST PER DOZEN.

4, 4½ and 5 in.	$1.25 per doz.	6 in.	$1.50 per doz.
5½ in.	1.38 "	7 in.	2.00 "
5¾ in.	1.50 "	8 in.	2.75 "

Sold by the Leading Wholesale Houses everywhere.

CHARLES MILLAR & SON,

SOLE MANUFACTURERS,

Order Early. UTICA, N. Y.

HILL'S

Eureka Dryer.

THE BEST

In the Market

For Indoor Use.

Also Manufacturers of

HILL'S

CHAMPION DRYER.

For illustration see last *Iron Age*. Circulars and discounts to the trade on application.

HILL DRYER CO.,

Worcester, Mass.

PATENT APPLIED FOR.

CAST STEEL RAKES, COKE FORKS AND GARDEN WEEDERS, MALLEABLE IRON RAKES,

AND ALL KINDS OF

FARMING TOOL HANDLES.

THE PIQUA HANDLE & M'F'G CO.,

PIQUA, OHIO, U. S. A.

The "Little Wonder" Injector.

Most reliable & cheapest in market.

Boiler Feeder.

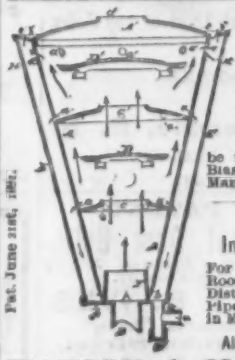
Pat. Oct. 22d, 1878.

WATSON'S STEAM PRESSURE REGULATOR.

For reducing and giving an even pressure, regardless of pressure on Boilers.

For Paper Mills, Heating Apparatus, Sugar Refineries, &c.

(Pat. Aug. 9th, 1881.)



Pat. June 21st, 1881.

McDANIEL'S

Patent Condenser Head

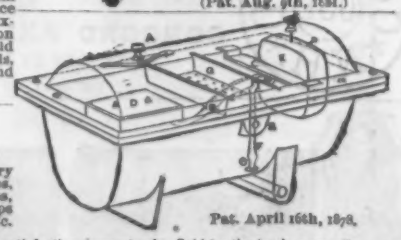
For Exhaust Steam Pipes.

Utilize the water of Exhaust Steam. Save your Roofs by keeping them dry, and avoid the nuisance created by Spray from Exhaust Pipes Blowing on Pavements, &c. It should be used by all Rolling Mills, Blast Furnaces, Breweries and Manufactories.

CHAPMAN'S

Improved Steam Trap,

For Heating Apparatus, Dry Rooms, Breweries, Factories, Distilleries, Sugar Houses, Pipes leading to Steam Pumps in Mines, Canning Houses, etc.



Pat. April 16th, 1878.

All the above sent on trial and satisfaction guaranteed. Sold by the trade generally.

WATSON & McDANIEL, 248 N. 8th St., Philadelphia.

Just What Was Wanted!

PHIPPS & BURMAN'S

NEW PATENT

DUPLEX TOILET CLIPPER.

Sharpens Itself.

Two Clippers in One. Adjustable Length of Cut.

Write for circular and prices of all of Phipps & Burman's Reversible, Self-Sharpening and other Horse and Barber Clippers.

JESSE LEE & SON, Sole Agents,

37 South 4th St., Philadelphia, U. S. A.

JOHN S. FRAY & CO., BRIDGEPORT, CONN., U. S. A.

Spofford Bit Brace.

Spofford Sleeve Brace.

The Spofford Bit Brace is made under Letters Patent of the U. A., granted to N. Spofford, March 23, 1880, assigned to John S. Fray & Co.

All Iron, Five Sizes.

No. 7	7 inch sweep.
No. 8	8 "
No. 10	10 "
No. 12	12 "
No. 14	14 "

Cocobolo Head and Handle, Nickel Plated.

No. 107	7 inch sweep.
No. 108	8 "
No. 110	10 "
No. 112	12 "
No. 114	14 "

Sleeve Brace, Nickel Plated.

No. 70	7 inch sweep.
No. 80	8 "
No. 100	10 "
No. 120	12 "

Covert Manufacturing Co.

COVERT'S HORSE AND MULE JEWELRY.

These Goods are sold by all leading jobbers in General and Saddlery Hardware, and the same discounts given from the lists to the trade as when purchased direct from the factory.

☞ Send for Illustrated Catalogue and Price List.

COVERT MANUFACTURING CO.,

Sole Manufacturers, WEST TROY, N. Y.

STANDARD VARNISH WORKS.

D. ROSENBERG & SONS,

734, 736, 738, 740 E. 14th St., NEW YORK. 243 Wabash Avenue, CHICAGO, ILL.

MANUFACTURERS OF JAPANS AND COPAL VARNISHES OF ALL DESCRIPTIONS.

Baking Japans and Bronzing Varnishes

SPECIALTIES.

Our Baking Japans and Bronzing Varnishes are being used by the leading consumers of these articles throughout this country and abroad, and we beg to refer to the following parties as to their superior qualities:

Singer Mfg. Co., Elizabethport, N. J., and Glasgow, Scotland.
Wheeler & Wilson Mfg. Co., Bridgeport, Ct.
American Sewing Machine Co., Philadelphia, Pa.
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Medina Mfg. Co., Medina, N. Y.
New Home Sewing Machine Co., Orange, Mass.
Florence Sewing Machine Co., Florence, Mass.
Sargent & Co., New Haven, Ct.
P. & F. Corbin, New Britain, Ct.
Stanley Works, New Britain, Ct.
Landers, Frary & Clark, New Britain, Ct.
Eaton, Cole & Burnham Co., Bridgeport, Ct.
Norwalk Lock Co., Norwalk, Ct.
Bradley & Hubbard Mfg. Co., Meriden, Ct.
Charles Parker Co., Meriden, Ct.
Washburn & Moen Mfg. Co., Worcester, Mass.
Trenton Lock and Hardware Co., Trenton, N. J.
Peck, Stow & Wilcox Co., Southington, Ct., and Cleveland, Ohio.
Shurmer & Massey Mfg. Co., Cleveland, Ohio.
Elbell, Gilliam & Co., Canton, Ohio.
Livingston & Co., Pittsburgh, Pa.
James Smart Mfg. Co., Brockville, Canada.
Burrows, Stewart & Milne, Hamilton, Canada.
R. M. Wanzer & Co., Hamilton, Can.
Buffalo Hardware Co., Buffalo, N. Y.
Sidney Shepard & Co., Buffalo, N. Y.
Enterprise Mfg. Co., Philadelp'a, Pa.
E. & T. Fairbanks & Co., St. Johnsbury, Vt.
Buffalo Scale Co., Buffalo, N. Y.
Jos. Barnhurst, Philadelphia, Pa.
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THE "SIMONDS" SAWS,

INCLUDING

CIRCULAR, GANG, MULAY, DRAG AND CROSS-CUT,

Are manufactured under a new system—covered by many patents—which produces a result hitherto unequaled.

THE "SIMONDS" KNIVES.

INCLUDING

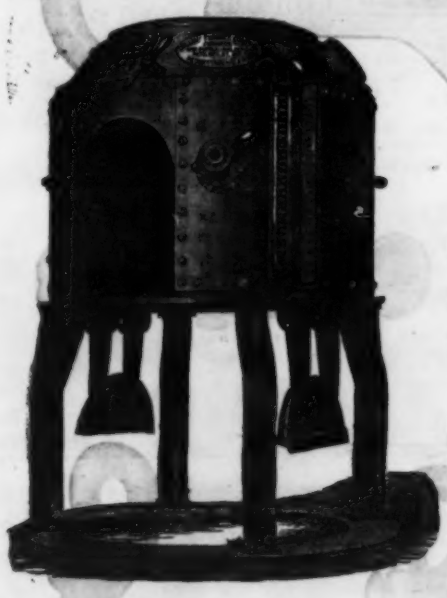
Planer Knives, Paper-Cutting Knives, Shingle, Stave and Jointer Knives, and Every description of Pattern Knives,

Are warranted of a superior quality.

Communications or orders for Saws, for Knives, or for Repairing will receive proper attention if addressed to

SIMONDS MANUFACTURING CO., Fitchburg, Mass.,
Or, Corner Canal and Washington Sts., Chicago, Ill.

Colliau Patent Cupolas.



The Advantages of the Colliau Improvements are:

1. A saving of from 20 to 50 per cent. of fuel by securing more perfect combustion at the melting point.
2. The iron is improved by the melting and a pure uniform metal is obtained.
3. Much greater rapidity of fusion, often doubling the ordinary cupola capacity.
4. Hot fluid iron all through the heat.
5. The cupola can be worked by unskilled workmen if instructions are followed.
6. Concentration of the fires in the smallest possible compass. The metal in fusion has less space to traverse while exposed to the oxydizing influence of the blast. This insures tougher castings and less waste by oxidation in the furnace.
7. The improvements can be applied to ordinary cupolas in a few days and without difficulty.
8. By this process the cupola does not clog. Melting is practically continuous as long as desired—100 tons of iron have been melted in one 58-inch cupola in six and one-half hours, and the cupola remained in perfect condition to the end.
9. A perfect "chilling iron" can be relied on when desired.
10. In the practical use of this cupola there is no fire to be seen at the loading doors, and no throwing off of combustible gases, carbonic acid gas alone escaping, the top of the cupola being as cool as if there was no fire below.

As a result of these improvements, it is claimed that the work of the Colliau cupolas has never been equaled in the quantity of metal melted in a given time, in the quantity melted in a given size of cupola, in economy of fuel used to the ton of iron in melting, in the ease and certainty of melting, in continuous melting as long as desired, in giving perfect castings to the end, in freedom from clogging or "hanging."

COLLIAU FURNACE COMPANY,
Foot of Mt. Elliott Ave., DETROIT, MICH.

Jarecki's Screw Plate and Pipe Cutter.

☞ WRITE FOR DISCOUNT AND DESCRIPTION.

No. 1	Cuts off and Threads	¼, ⅜, ½, ¾, ¾	$14.00	No. 4½	Cuts off and Threads 1½, 2, 2½, 3	$35.00
No. 2	" "	⅜, ½, ¾, 1, 1¼	16.00	No. 5	" " 2½, 3, 3½, 4	50.00
No. 3	" "	1, 1¼, 1½, 2	20.00	"	" " 4½, 5, 6	75.00
No. 3½	" "	⅜, ½, 1, 1¼, 1½, 2	22.50			

JARECKI MANUF'G CO., ERIE, PA.,
MANUFACTURERS OF
Malleable and Cast-Iron Pipe Fittings, Brass and Iron Valves and Cocks for Steam, Gas, Water and Oil; Pumps, Machinery and Supplies for Artesian Wells.
☞ ILLUSTRATED CATALOGUE ON APPLICATION.

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The CHEAPEST, most RELIABLE, DURABLE and CONVENIENT Self-Adjusting Skate Ever Made.

Can be Changed to Boots varying in Size INSTANTLY by a Simple Movement of the Latch.

No WRENCHES, KEYS, SCREWS or NUTS to be Lost.
This Skate is entirely ORIGINAL in Detail and Combination.

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Sole Agents for the United States,
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OFFER TO CONSUMERS
THE BEST METALLIC PAINT MANUFACTURED IN THE UNITED STATES.

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For sale by the principal paint dealers and hardware merchants in the United States.

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For Elevators, Malt Kiln Floors, Grain Dryers, Threshers, Separators, Corn Shellers and all kinds of Grain Cleaning Machinery; also for Mining and Concentrating Works, Coal, Coke and Ore Screens, Gas and Water Works, Paper, Woolen, Flour and Oil Mills, Filters, Strainers, Ventilators, etc. PERFORATED TIN AND BRASS of all sizes. Special attention given to work for Railroads and Car Builders. Iron, Steel, Copper, Brass and Zinc Punched to any size and thickness required. Correspondence solicited.

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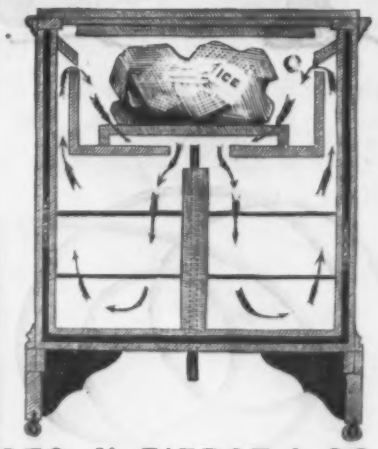

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New York Office, - 195 Water Street.
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BIRD CAGES and REFRIGERATORS.
Send for Illustrated Catalogue and Price Lists.
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Sickles, Preston & Co., Davenport, Iowa.
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Armstrong's Improved Adjustable Stock and Dies

FOR PIPE AND BOLTS.

Tapped to the U. S. and Whitworth Standard Gauges. *Adjustable* to all variations in the size of fittings. Can be *resharpened without drawing the temper* by simply grinding them. Possessing practical advantages appreciated by all mechanics. Circular and Price List sent free on application.

Manufactured by F. ARMSTRONG, 30 Sterling St. Bridgeport, Conn.

REMOVAL OF THE MEDART PATENT PULLEY CO..

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WROUGHT RIM PULLEYS.

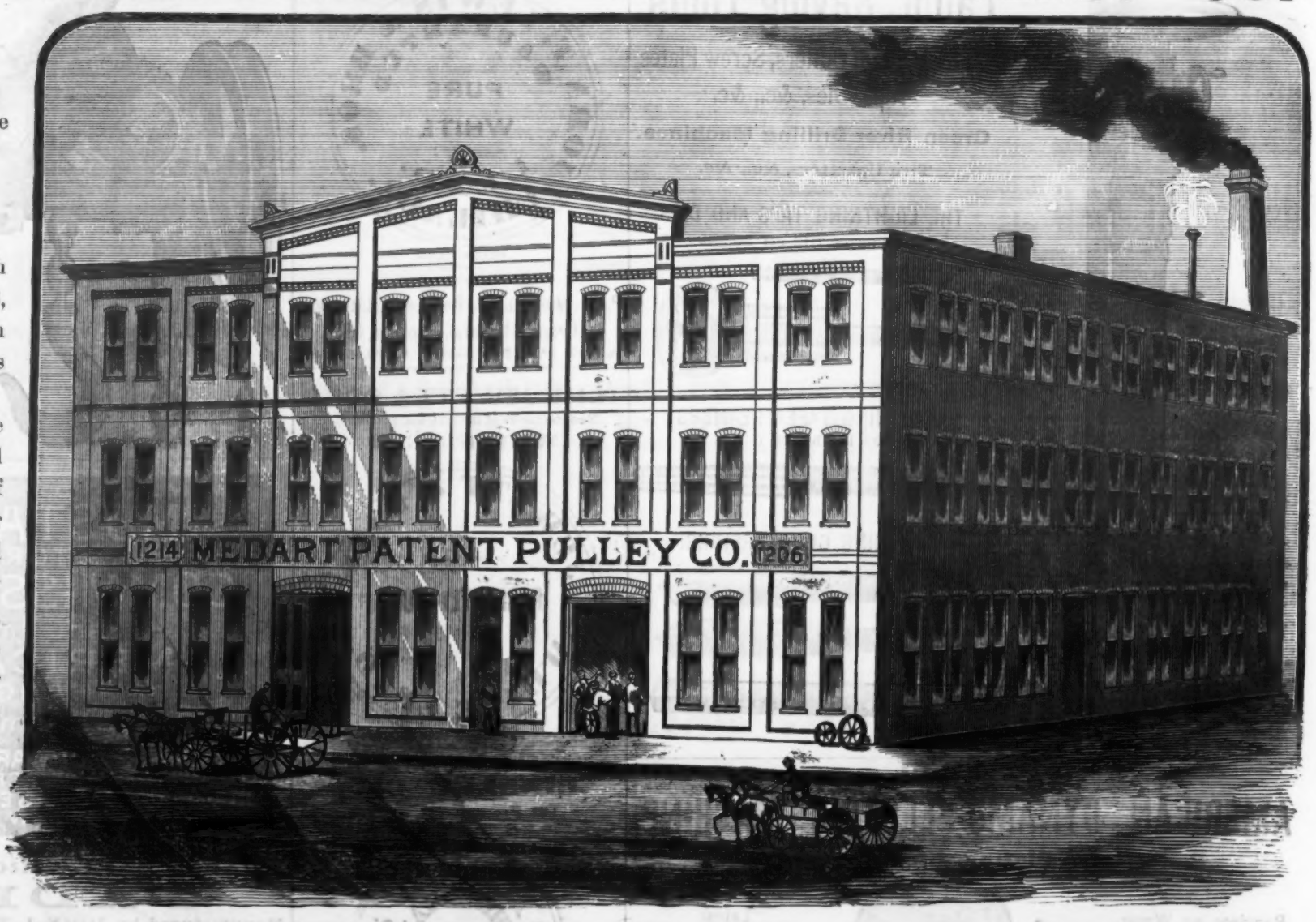
The Lightest, the Strongest, the Best Balanced and the Cheapest in the World.

This cut represents our mammoth new building, Nos. 1206, 1208, 1210, 1212 and 1214 North Main street, which we now occupy as factory and office.

Our works are fitted up in the best style, with new and improved machinery, giving us a capacity of fully 300 pulleys per day, and our facilities for prompt delivery and first-class work excel those of any other manufacturer in the country.

Our pulleys have been extensively used for four years, and their superiority in all respects over all other kinds is universally acknowledged.

We warrant them for all classes of work, from the lightest to the heaviest.



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Iron Clad Can Trimmings, Solder, &c.

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50 PER CENT. of time and labor saved by every mechanic using this solid, quick-working Vise. Strongest and most durable of any Vise in the market. Has the latest improved taper, pipe, and other attachments.

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THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice Crushers, being the only firm in the United States who manufacture all parts of the raw material. The Examining Committee, consisting of 50,000 Citizens of the United States, have recommended the *Sands' Triple Motion White Mountain Freezer* to all persons in the world, for the following reasons: We have used them; they *freeze* quicker than any other; they save time, salt and ice; the triple motion makes smooth cream without bunches; makes more of it; galvanized iron outside; tin inside; no zinc in contact with the cream; easily adjusted; substantially made; simple in construction; perfect in results. Send for descriptive circular and discount of this celebrated Freezer. Address,

HAND FREEZER 2 to 25 qts. $3.75 to $25.00

HAND OR POWER. 25 and 40 qts. $75.00 and $175.00

HAND OR POWER ICE CRUSHER. $75.00

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Nashua, N. H., U. S. A.

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Exhibitions of 1862, 1865, 1867, 1873, 1873, and only Award and Medal for Noiseless Steel Shutters at Philadelphia 1876, Paris 1878, and Melbourne 1881.

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Original Inventors and Sole Patentees of

Noiseless, Self-Coiling, Revolving Steel Shutters.

Fire and Burglar Proof Also, improved ROLLING WOOD SHUTTERS of various kinds, and Patent METALLIC VENETIAN BLINDS.

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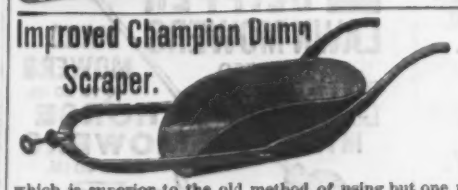
Improved Champion Dump Scraper.



We are the exclusive manufacturers of

Byrket's Improved Dump and Automatic Steel Scrapers.

We manufacture the only successful Automatic Scraper in the world. Our Dumps are the lightest and strongest scrapers made. We use two pieces of steel pressed into shape, which is superior to the old method of using but one piece, for when that breaks the whole scraper is ruined, while ours is so constructed that we can replace any part at a trifling expense. We make three sizes, to meet the wants of all classes of Earth Workers. Especially suited for Contractors and Township Road Work. Send for circulars. Manufactured by

THE CHAMPION SCRAPER CO., Troy, Ohio.

PRICES.

4 in., doz	$1.20
6 "	1.80
7½ "	2.40
9 "	3.00

Dis., 25 per cent.

WRITE FOR DISCOUNTS.

9 opens 2 1-8 inches. Weight, 26 oz.

RETAILS FOR 25 CENTS.

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FITTINGS. Malleable and Gray Iron, All Kinds.

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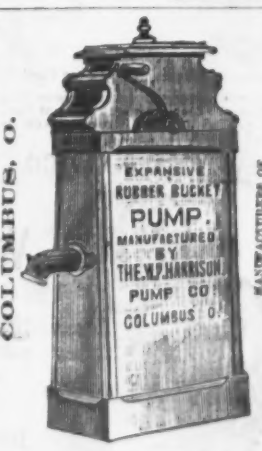

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Agents Wanted throughout the United States.

LEVER

Lemon Squeezer,

With perforated strainer. It will squeeze one-third more juice from a lemon than any other; also quicker and more durable than any other.

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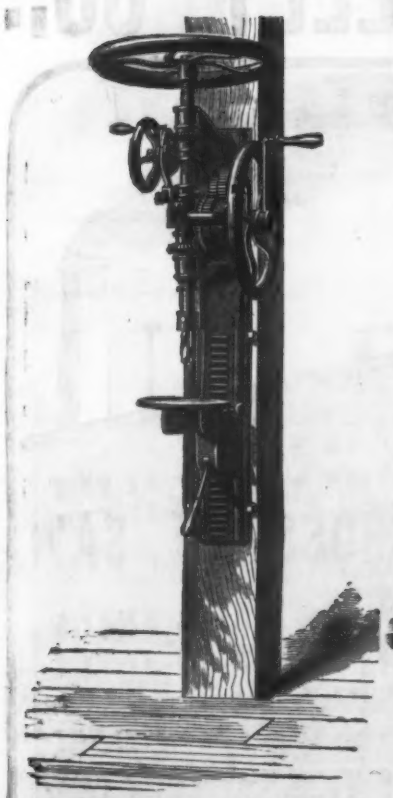

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Lightning Bolt Cutters, Screw Plates, Taps, Dies, &c., &c.

Green River Drilling Machines.

Tire Upsetters, &c., &c.

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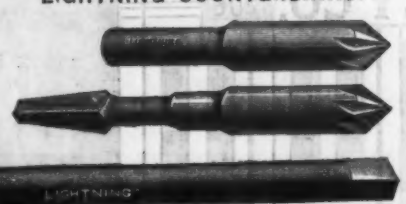
FOR USE IN THE BIT BRACE.

LIGHTNING TAPER REAMERS
FOR BIT BRACE USE.

LIGHTNING COUNTERSINKS.



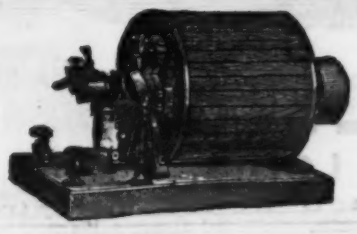
GREEN RIVER DRILL No. 4.
Weight, 250 lbs

Send for Illustrated Price List.

THE AMERICAN DYNAMO-ELECTRIC MACHINE,

For Electro-Plating. Electrotyping, &c.

Requires no Water. Combining all the



Latest Improvements. Cannot Reverse Current.

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Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.

540, 542, 541 & 546 WEST 16TH STREET, N. Y.

Headquarters for Agricultural Implements.

Copper Strip Feed Cutters. Lever Feed Cutters. Family Cider Mill. Union Cider Mill.

☞ The above cuts are specimens from our Illustrated Price List.
☞ Our "Indiana" Steel Plows, at price of Cast Iron, are the best kind for dealers to handle. No trouble. We manufacture 800 different Steel and Iron Plows and repairs for many different Plows and Cultivators. Machinery and Malleable Castings.

THE NEW YORK PLOW CO., 55 Beekman St. Works, Yonkers, N. Y.

THE

WAVERLY APPLE PARER.

It has the quick return motion of knife. The Knife is screwed on. The pinions have square holes and are fitted on shafts with square ends. The parings cannot fall into the gearing. It is rapid, effective, simple. Send for circular.

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Hardware Specialties, Mechanics' Tools, &c.

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JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

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Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil,

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Manufacturers of the well-known brand

WHITE LEAD

JEWETT & SONS' PERFECTLY PURE WHITE LEAD.

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ALSO MANUFACTURERS OF

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ATLANTIC WHITE LEAD & OIL CO. WARRANTED PURE ROBERT COLGATE TRADE MARK

The Atlantic White Lead and Linseed Oil Co.,

Manufacturers of

White Lead (Atlantic), Red Lead, Litharge, Glass Makers' Litharge and Orange Mineral;

LINSEED OIL,

Raw, Refined and Boiled.

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CORRODERS AND MANUFACTURERS OF

PURE WHITE LEAD.

SALEM LEAD CO. 100 WARRANTED PURE SALEM, MASS.

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EXCELSIOR AND CLIPPER LAWN MOWERS

GUARANTEED BEST & CHEAPEST

LARGE REDUCTION IN PRICE

HAND MOWERS 10 TO 20 IN.

HORSE MOWERS 25 TO 40 IN.

Send for Circular & Price-List.

CHADBORN & COLDWELL MANUF'G CO. NEWBURGH, N. Y.

A. F. PIKE,

Pike Station, - - - New Hampshire,
Manufacturer and Wholesale Dealer in

Bluestone

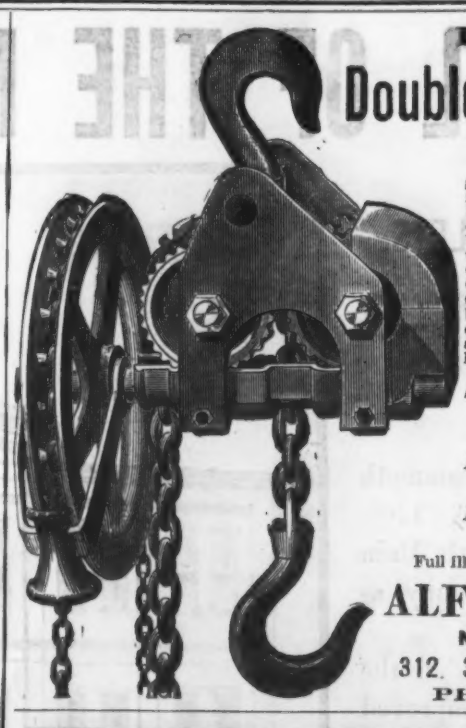
For Scythes, Axes, Knives and Turpentine Hacks

Factories at Pike Station, N. H. and Evansville & Westmore, Vt.
Genuine Old Reliable,
Indian Pond (Red End),
Premium, Union,
White Mountain,
Letolle, Hacker,
Diamond Grit,
The New Rose,
Lamollie, Rugg,
Willoughby Lake,
Green Mountain,
Black Diamond,
Mowing Machine,
German Pattern,
Chocolate, Ax Bitts.

Stones made, labeled and branded in any style desired. PRICE and QUALITY GUARANTEED. All the above brands are of clear keen grit, and *will not glaze.*

BOX'S PATENT

Double Screw Hoists.



The unbounded reputation these Hoists have gained for themselves the last four years has no equal. There are now over 7000 in use. Large manufacturers have duplicated their orders a dozen times over. They are in use by all city departments, railroad companies, the United States Government, the English Government, the French Government, the Chinese Government, and in Russia, Germany, Chili, Brazil, Venezuela and Cuba. They have been awarded three silver medals and five diplomas. One trial will convince you they are the best in every particular. Sizes, 500 lbs. to 40,000.

Superior Hand and Power Traveling Cranes, from 1 to 40 tons.

Elevators for Heavy Work, 1 to 10 tons capacity.

Radial Drills of the Most Improved Kind.

Full Illustrated Circulars on application.

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Northern Liberty Works,
312, 314 and 316 GREEN STREET,
PHILADELPHIA, PA.

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STOREKEEPERS,

COMMISSION AGENTS

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BRASS, MALL. IRON AND SCANDINAVIAN

PADLOCKS,

Manufactured by JOHN J. TOWER, 96 Chambers St., New York.

BEST QUALITY. LARGE VARIETY.

Railroad and other Padlocks made to order.

GREATEST ROCK BREAKER ON EARTH.

CAPACITY { A TON A MINUTE. DON'T FORGET IT.

Guaranteed to do Double the Work of any other or Money Refunded.

SEND FOR CIRCULARS.

ALSO

Engines, Boilers, Stamp Mills and Mining Machinery.

GATES IRON WORKS,

52 Canal St., Chicago.

GEO. M. SCOTT,

Bellows Manufacturer.

Johnson Street. Cor. 22d St., CHICAGO, ILL.

FLAMMANG INJECTOR CO.,

MANUFACTURERS OF

THE BEST AND MOST IMPROVED INJECTOR ON THE MARKET.

Send for Catalogue to

44 Atwater Block - - CLEVELAND OHIO.

IRON ROOFING.

Extra quality. Best plan in use. (Sold as low as any other

MANUFACTURED BY

T. C. SNYDER & CO., Canton, Ohio.

Cheap, strong and durable. Does not get out of repair. Every roof sold in even years satisfactory. Any mechanic can apply it. Circular and sample free. Also manufacturers of the best and cheapest Metallic Paint in use.

GARRY IRON ROOFING COMPANY

Largest manufacturers of Iron Roofing in the world. Manufacturers of all kinds of

IRON ROOFING

Crimped and Corrugated Siding, Iron Tile or Shingle, Fire-Proof Doors, Shutters, &c

IRON ORE PAINT AND CEMENT.

152-158 MERWIN STREET, CLEVELAND, O.

Send for Circular and Price List No. 9.

FIRE BRICK, TILE, SHAPES.

CLIMAX FIRE BRICK CO.,

Successors to Red Bank Fire Brick Co.,

Blast Furnace and Steel Hole Brick

A SPECIALTY.

THOS. JOHNSTON, Agt., P. O. Box 976, Pittsburgh, Pa.

The Iron Age Directory

and Index to Advertisements.

NEW YORK WHOLESALE PRICES, July 3, 1883.

METALS.

IRON.—DUTY: Bars, 8-10c to 1 2-10c ₩ lb; provided that no Bar Iron shall pay a less rate of duty than 35 %. Sheet, 1 2-10c ₩ lb to 30 % ad val. Boiler, 1 1/4c ₩ lb. Band, Hoop and Scroll, 1c to 1 4-10c ₩ lb. Pig, 3-10 of 1c ₩ lb. Wrought and Cast Scrap, 3-10 of 1c ₩ lb. Railroad Bars, weighing more than 25 lb ₩ yard, 7-10 of 1c ₩ lb. Steel Railroad Bars, weighing more than 25 lb ₩ yard, $17 ₩ ton.

American Iron.		
Foundry, No. 1	₩ ton	$22.00 @ 23.00
Foundry, No. 2	₩ ton	20.00 @ 21.00
Gray Forge	₩ ton	18.00 @ 19.00
Scotch Iron.		
Eglinton	₩ ton	21.00 @ 21 50
Carnbros	₩ ton	22.00 @ 22 50
Coltness	₩ ton	23.50 @ 24.00
Shotts	₩ ton	24.00
Glengarnock	₩ ton	23.00
Gartsherrie	₩ ton	24.00
Langloan	₩ ton	23 50
Summerlee	₩ ton	23.00 @ 23.50
Rails.		
Steel at Eastern mills	₩ ton	38.00
Old Rails 78		22.00 @ 23.00
Scrap.		
Wrought, ₩ ton from ship and yard		30.00 @ 34.00
Bar Iron from Store.		
Common Iron		
3/8 to 1 in. round and square	₩ lb	2.15 @ 2.20c
1 to 6 in. x 3/8 to 1 in	₩ lb	2.15 @ 2.20c
Refined Iron:		
3/8 to 2 in. round and square	₩ lb	$2.30 @ 2.40c
1 to 6 in. x 3/8 to 1 in	₩ lb	2.30 @ 2.40c
1 to 6 in. x 1/4 and 6-10	₩ lb	2.50 @ 2.60c
Rods—3/8 and 11-16 round and square	₩ lb	2.40 @ 2.50c
Bands—1 to 6x3-16 to No. 13	₩ lb	2.70 @ 2.80c
Norway Nail Rods		1/4 @ 1/4c

Sheet Iron.	Common American.	R. G. American.
Nos 10 to 16	₩ lb 3.15 @ 3.20c	4.40
17 to 20	₩ lb 3.40 @ 3.60c	4.60
21 to 24	₩ lb 3.65 @ 3.90c	4.90
25 to 26	₩ lb 3.90 @ 4.15c	5 c
27	₩ lb 4.15 @ 4.35c	5 c
28	₩ lb 4.40 @ 4.65c	5.40
	B. H.	30 qual.
Galvanized 10 to 20	₩ lb	7.40
Galvanized, 21 to 24	₩ lb	6.40
Galvanized, 25 to 26	₩ lb	7 c
Galvanized, 27	₩ lb	7.40
Galvanized, 28	₩ lb	8 c
Patent Planished	₩ lb	B. 6.40c
Russia	₩ lb	@ 14c
American Cold Rolled	₩ lb	@ 7.40c

COPPER.—DUTY: Pig, Bar and Ingot, 4c; Old Copper per 2c ₩ lb. Manufactured (including all articles of which Copper is a component or chief value), 35 % ad valorem.

American Ingot ₩ lb See Trade Report.

SHEATHING BRAZIERS COPPER, BOLTS, &c.

Brazier's Copper, ordinary sizes, 16 oz. per sq. ft., and over ₩ lb 26c

Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft. ₩ lb 28c

Braziers' Copper, 12 oz. and 12 oz., ₩ sq. ft. ₩ lb 30c

Braziers' Copper, Lighter than 12 oz. ₩ sq. ft. ₩ lb 32c

Circles less than 24 in. in diameter ₩ lb 28c

Circles 24 in. diameter and over ₩ lb 31c

Segment and Pattern Sheets ₩ lb 26c

Locomotive Fire Box Sheets ₩ lb 26c

Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 31c

Bolt Copper ₩ lb 26c

Copper Bottoms ₩ lb 31 @ 36c

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

Sheets 14 x 28 ₩ sheet 8c

All other size Sheets, 3c ₩ sq. ft.

For tinning both sides, double the above amount.

O'REILS PATENT PLANISHED COPPER.—Net.

14x48.

14 and 16 oz. and heavier ₩ lb 37c By the case ₩ lb 36c

12 oz. and lighter ₩ lb 40c " ₩ lb 39c

Boiler Sizes.

7 in., 14x42. 8 in., 14x56. 9 in., 14x63.

14 and 16 oz. and heavier ₩ lb 39c By the case ₩ lb 38c

(And all sizes not over 20 in. wide.)

24x48, 30x60.

14 and 16 oz. and heavier ₩ lb 41c

32 ₩ lb 44c

SHEATHING METAL.

Yellow Sheathing metal ₩ lb 20 @ 22c

BRASS.

Brown & Sharpe's Gauge the Standard for Metals.
Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis. 30 %.

June 12, 1880.

Cash prices for Roll and Sheet Brass. For less quantities than 100 lbs add 2c. ₩ lb.

HIGH BRASS.

All Nos. not thinner than No. 26, wider than 2 in., not wider than 14 in. 30c

All Nos. to No. 26, inclusive, and widths over 14 to 20 in., inclusive 35c

All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive 38c

4c. ₩ lb advance on each No. above Nos. 26 to 28, inclusive

All Brass thinner than No. 28 is Platers' Brass, at 43c

Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 45c

Printers' Rules 45c

Sheets wider than 30 in. and under 40 in. 47c

" 40 in. and over 50c

Circular Sheets, in diam. from 4 in. to 14, inclusive 40c

" over 14 " 20, " 45c

" " 20 " 30, " 49c

" " 30 " 40, " 55c

" " 40 in. 60c

LOW BRASS.

Four cents ₩ lb more than High Brass

Gilding Metal, 8c ₩ lb more than High Brass.

Platers' or Gold Metal { In Bars 42c; Sawed 43c; Planed or Polished 54c

FOR SLITTING.

Metal, in width 1 in. to 1/4 in. to No. 28, inclusive, 10 ₩ lb advance.

Metal, in width 2 in. to 1 in thinner than No. 28, 20 ₩ lb advance.

Metal, in width 1 in. to 1/4 in thinner than No. 28, 30 ₩ lb advance.

Metal in width 1/4 in. to 3/4, inclusive, not thinner than No. 28, 27 ₩ lb advance.

Metal in width 1/4 in. to 1/4 thinner than No. 28, 50 ₩ lb advance.

Metal, 1/4 in. in width and less, 100 ₩ lb advance.

Any of the above widths cut to particular lengths, add 70 ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent., 12 inch to No. 26	$0.52	$0.75
5 " " "	.56	.76
6 " " "	.64	.86
7 " " "	.74	1.03
8 " " "	.82	1.12

German Silver Sheets over 12in. wide and weighing more than 30 lb., 8c ₩ lb.

Advance 2c. for each additional inch in width above 12 in. and 2c. ₩ lb on each No. thinner than Nos. 26 to 28, inclusive.

All German Silver thinner that No. 36 is Platers', at 40c. ₩ lb additional.

German Silver Scrap, one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 6 to 20	$0.33	$0.37	$0.38
No. 21	.36	.40	.46
No. 22	.37	.41	.47
No. 23	.38	.42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.53
No. 26	.45	.49	.55
No. 27	.48	.52	.58
No. 28	.52	.56	.63
No. 29	.55	.59	.66
No. 30	.58	.62	.72
No. 31	.62	.66	.78
No. 32	.66	.70	.84
No. 33	.70	.74	.93
No. 34	.74	.78	1.03

Spring Wire 20 ₩ lb advance

Flat Square and Half-Round Wire 5c ₩ lb advance on Round Wire.

Fancy Wire not less than 10c ₩ lb advance on Round Wire.

Brass Rods, No. 8 and larger, not less than 2 feet lengths, 38c.

Wire straightened and cut smaller than No. 8 and not less than 2 feet lengths, 43c.

Wire and Rods less than 2 feet lengths, special rates.

Twelve cents per lb extra for spooling on 1 lb spools No 36.

MISCELLANEOUS.

Brass Pail Ears	$0.40
Brass Door Rail	.45

SCRAP.—Net.

High Brass Scrap	12c
Low Brass Scrap	10c
Gilding	10c

Turnings, Filings and Chips sell the price of Scrap.

Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis. 30 %.

	₩ lb
Plain No 20 inclusive above 1/4 in. to 3 in.	$0.42
Plain above 3 in.	.42

Nos 21, 22, 23, two cents advance on List for each Number.

Nos. 24, 25, 26, four cents advance on List for each Number.

Above No. 26, special rates.

Patent, 1/4 inch 78

Patent, 3/16 inch 1.10

Patent, 1/8 inch 1.00

All Mandrel Drawn Tubes 4 cents advance on List Prices.

Fancy Tubing to No. 25 6c

English, Scotch and Extra Patterns Fancy Tubing 50 and 10 %

Tubing 6 feet or Cut 2 to 4 feet long, 2 cents advance on List

Add two cents, ₩ cent for each additional cutting under 1 oz.

All Mandrel Drawn Tubes under 3/8 in. 25 cents per pound advance.

ZINC TUBING.—dis. 25 %.

Plain	37
Fancy	43
Scotch and Extra Patterns	35

GERMAN SILVER TUBING.—dis 25 %.

4 Per cent.	.30
6 Per cent.	.90
9 Per cent.	1.00
12 Per cent.	1.20
15 Per cent.	1.35
16 Per cent.	1.45
18 Per cent.	1.50
20 Per cent.	1.65

STEEL.—DUTY: Ingots, Bars, Sheets, &c., valued at 4c ₩ lb or less, at 45 % ad val. Valued above 4c and not above 7c ₩ lb pays 2c ₩ lb duty; valued above 7c and not above 10c ₩ lb pays 2 3/4c ₩ lb duty; valued above 10c ₩ lb pays 3 1/4c ₩ lb duty. *Extras.* "Steel bars, rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, shall pay 1/4c ₩ lb in addition to above." Steel Circular Saw Plates shall pay 10 ₩ lb in addition to the above.

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.

Best Cast	₩ lb 15 1/2c
Extra Cast	₩ lb 12 1/2c
Circular Saw Plates	₩ lb 15c
Round Machinery, Cast	₩ lb 10c
Swaged, Cast	₩ lb 10c
Best Double Shear	₩ lb 14 1/2c
Blister, 1st quality	₩ lb 13c
German Steel, Best	₩ lb 11c
2d quality	₩ lb 10c
3d quality	₩ lb 9c
Sheet Cast Steel, 1st quality	₩ lb 21 1/2c
2d quality	₩ lb 14 1/2c
3d quality	₩ lb 2 1/2c
ANTIMONY	See Trade Report

LEAD.—DUTY: Pig, $2 ₩ 100 lb Old Lead, 2c ₩ lb

Pipe and Sheet, 3c ₩ lb.	
American	4.65 @ 4.75c
Bar	6c
Pipe	6 1/2c, dis 10 %
Tin Lined Pipe	15c, dis 10 %
Sheet	7 1/2c, dis 10 %
Shot	Drop 7c, Buck. 8c
Chilled Shot	8c

BABBITT METAL.

N. P. U.	₩ lb 8c
A. 26c; B. 20c; C. 14.	

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1c ₩ lb; Bars, Block and Pigs free.

Banca	₩ lb 23 1/2c
Straits	₩ lb 23 1/2c
English	₩ lb 24 c

TIN PLATES.

I C 10x14 } Prime Charcoal	$5.25 @ 5.75
I C 14x20 }	
Second quality	$5.87 1/2 @ 6.25
I C 12x12 Prime Charcoal	5.50
I X 10x14 } Prime Charcoal	7.75 @ 8.00
I X 14x20 }	
Second quality	$7.25 @ 7.50
I X 12x12. Prime Charcoal	6.25
D C 12 1/2x17. Prime Charcoal	5.75
D X 12 1/2x17. Prime Charcoal	7.25
For each additional X add	1.50

COKE TIN PLATE.

	Best.	Ordinary.
I C 12x14 }	$4.90	$4.15 @ 4.40
I C 14x20 }		
I C 12x12	5.75	5.40 @ 5.50

TERNE PLATE.

	Prime Char.	2d Qual.	Coke.
I C 14x20	$4.40 @ 5.85	4.25	4.12 1/2
I X 14x20	7.00	....	....
I C 20x28	10.75 @ 11.25	10.00	10.00 @ 10.25
I X 20x28	13.00	....	....
I C 20x28	14.00	....	....
I C 14x20 M. F. Brand			$7.87

SOLDER—1/4 & 1/4 18c

Extra 19 1/2c

No. 1 13 c

SPELTER.—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lb.

American, cash	5.00 @ 5.25
ZINC.—DUTY: Pig or Block, $1.50 ₩ 100 lb; Sheet 2 1/2c ₩ lb.	
Sheet, Cask	6 1/4 @ 6 1/2c
Sheet, Open	6 1/4 @ 7c

Paper Stock, &c.

(Dealers Selling Prices.)

	Cents ₩ lb.
White Shirt Cuttings, No. 1	6 1/4 @ 7
White Shirt Cuttings, No. 2	5 @ 5 1/4
Mill Assorted Whites	3 1/4 @ 3 1/2
Unbleached Muslins	3 1/4 @ 3 1/2
City Whites, No. 1	4 1/2 @ 4 3/4
New Canton Flannels	6 @ 6 1/2
New Seconds, light	3 1/4 @ 3 1/2
New Seconds, dark	2 1/2 @ 3
No. 2 Whites	2 1/2 @ 2 3/4
Cotton Canvas	4 1/2 @ 4 3/4
Linen Canvas, No. 1	4 1/2 @ 4 3/4
Seconds, City No. 1	3 1/2 @ 3 3/4
Seconds, City No. 2	2 1/2 @ 2 3/4
Colors, per cwt	70 @ 80
Manila Rope	3 @ 3 1/2
Manila Rope, Tarred	2 1/2 @ 3
Gunny Bagging, No. 1	2 @ 2 1/4
Gunny Bagging, No. 2	1 3/4 @ 1 7/8
Kentucky Bagging	4 1/2 @ 4 3/4
Burlap Bagging, No. 1	2 1/4 @ 2 1/2
Tar Shakings	2 @ 2 1/4
Hemp Twine Stock	4 1/2 @ 4 3/4
Hard White Shavings, No. 1	4 @ 4 1/4
Soft White Shavings, No. 1	3 1/4 @ 3 1/2
White Shavings, No. 2, soft	3
Mixed shavings, part white	2 1/2 @ 3
Ledger and Writing	3 @ 3 1/4
Solid Stock	2 1/2 @ 2 3/4
Book Stock, No. 1, light	1 1/2 @ 1 3/4
Old Newspapers	1 1/2 @ 1 3/4
Pure Manilas	1 1/2 @ 2
Bogus Manilas and Hardwares	1/2 @ 1
Commons per 100 lbs	60 @ 70
Binders' Board Cuttings	1/2 @ 1
Straw Board Cuttings per cwt	75 @ 80

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb 22 @ 24c
Black Lamp, Ordinary	₩ lb 0c
Black Ivory Drop, fair	12 @ 15c
Black Ivory Drop, best	22c
Black Paint, in oil	kegs 8c; asst'd cans, 11c
Blue Prussian, fair to best	40 @ 45c
Blue Prussian, fair to best, in oil	45 @ 50c
Blue Chinese dry	70c
Blue Ultramarine	18 @ 30c
Brown, Spanish	12c
Brown, Van Dyke	10 @ 12c
Green, Chrome	15 @ 23c
Green, Chrome, in oil	14 @ 18 @ 20c
Green, Paris	good, 20c; best, 24c
Green, Paris, in oil	good, 30c; best, 45c
Iron Paint, Bright Red	₩ lb 2 1/2c
Iron Paint, Brown	₩ lb 2 1/2c
Iron Paint, Purple	₩ lb 3 c
Iron Paint, Ground in oil, Bright Red	₩ lb 4 1/2c
Iron Paint, Ground in oil, Red	₩ lb 3 1/2c
Iron Paint, Ground in oil, Brown	₩ lb 4 1/2c
Iron Paint, Ground in oil, Purple	₩ lb 6 c
Mineral Paints	2 @ 4c
Orange Mineral	18c
Red Lead, American	7c
Red Venetian (Eng.) dry	$1.65 @ $1.70
Red Venetian, in oil	asst'd cans, 11c; kegs, 8c
Red Indian dry	9 @ 12c
Rose Pink	10 @ 13c
Sienna, American, Raw, powdered	4c
Sienna, Burnt, powdered	4 1/2c
Sienna, Burnt, in oil	10 @ 16 @ 20c
Sienna, Raw	11 @ 15 @ 25c
Umber, Burnt, powdered	4 @ 8c
Umber, Burnt, in oil	9 @ 13 @ 15c
Umber, Raw, powdered	3 1/2 @ 7 1/2c
Umber, Raw, in oil	10 @ 16 @ 18c
Vermilion, Chinese	90c
Vermilion, English	46 @ 48c
Vermilion American, Common	15c
White Lead, American, pure dry	6 1/2 @ 6 3/4c
White Lead, American, pure in oil	6 3/4 @ 7c
White, Paris, English, prime	in bbls. 2 @ 2 1/2c
Yellow Ochre, French	$1.75
Yellow Ochre, French, in oil	asst'd cans, 11c; kegs, 8c
Yellow Ochre, Vermont	in casks, 1 1/2c
Yellow Chrome	17 @ 27c
Yellow Chrome, in oil	14 @ 18 @ 20c
Zinc White, American No. 1, dry	5 @ 6c
Zinc White, American No. 1, in oil	9c
Zinc White, French (Paris) dry	8 @ 10c
Zinc White, French, in oil	10 @ 11c

Oils.

Linseed Raw, in casts and bbls	56c @ 57c
Linseed Boiled, in casks and bbls	59c @ 60c
Linseed, Calcutta	48 @ 50c
Bleached Whale	₩ gal. 62c
Bleached Sperm	₩ gal. $1.22
Bleached Elephant	72c
Neatsfoot	85c
Prime Lard	84c
No. 1 Extra	78c
West Virginia	8c @ 15c
Drilling	10c
Miners' Oil	47c @ 49c
Fish Oil, pressed	47c @ 49c
Neatsfoot	75 @ 80c
Tallow	70c @ 74c
Empire Cylinder Oil	54c
Machinery	40c
Engine	32c

Sundries.

Asphaltum Cuban	4c @ 8c
Asphaltum Egyptian	5c @ 8c
Benzine	₩ gal. 9c @ 11c
Chalk, Block	90c
Dryer's Patent Am'n	asst'd cans, 60; kegs 7c
Gilders, Red	4c
Gilding, White	24 @ 30c
Glue, Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	35c
Gum, Damar	20c
Gum Shellac, English	40c
Gum Shellac, English, dark	35c
Litharge	7 1/2c
Mineral Wool, ordinary	₩ lb 2 @ 2 1/2c
Mineral Wool, extra	₩ lb 3 @ 3 1/2c
Pumice Stone, selected Lumps	4 @ 5c
Pumice Stone, Powdered	2 1/2c
Pine Tar, Obis	$2.75
Pitch	$1.40
Putty, in bladders	3c
Putty, in bulk	2 1/2c
Rosin—Common and Good—Strained	$1.50
E & F	$2.10 @ $2.20
G & H	$2.30 @ $2.40
I & K	$2.50 @ $2.60
M & N	$2.00 @ $2.25
Spirits Turpentine	37 1/2 @ 38 1/2c
Whiting Spanish	2c
Waste, No. 1 Cop	10c
Waste, No. 1 White Machine	10c
Waste, No. 2 White Machine	8 1/2c
Waste, No. 1 Colored	7c
Waste, No. 2 Colored	6 1/2c
Waste Washed Machine	c

Glass.

Prices current per box of 50 feet.
List, July 3, 1883.

Single.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$13.50	$11.50	$10.75	$10.25
11 x 14 to 16 x 24	14.50	13.50	12.50	12.50
18 x 22 to 20 x 28	18.50	17.00	16.00	14.00
15 x 36 to 24 x 30	20.50	19.50	18.25	
26 x 26 to 24 x 36	22.00	20.00	17.50	
26 x 36 to 26 x 44	24.00	22.00	18.50	
26 x 46 to 30 x 50	26.00	24.00	20.50	
30 x 42 to 30 x 54	27.00	24.00	21.50	
30 x 58 to 34 x 56	29.00	27.00	24.00	
34 x 58 to 34 x 60	31.00	29.00	25.00	
36 x 60 to 40 x 60	34.00	31.00	27.00	

Double.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$17.50	$15.00	$14.00	$13.00
11 x 14 to 16 x 24	20.50	18.00	16.50	
18 x 22 to 20 x 30	24.00	22.00	20.00	
15 x 36 to 24 x 30	26.50	24.00	21.50	
26 x 28 to 24 x 36	29.00	26.00	23.00	
26 x 36 to 26 x 44	31.00	28.00	24.00	
26 x 46 to 30 x 50	34.00	31.00	27.00	
30 x 42 to 30 x 54	35.00	32.00	28.00	
30 x 56 to 34 x 52	37.00	34.00	30.00	
34 x 58 to 34 x 60	40.00	37.00	32.00	
36 x 60 to 40 x 60	43.00	40.00	37.00	

Sizes above—$15 per box extra for every 5 inches. An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the united 84 inches bracket.

Discount, 70 and 10.


Fruit, Wine & Jelly Press.


SAUSAGE STUFFER.

Self-Measuring Faucet.

NO. 20 COFFEE MILL.

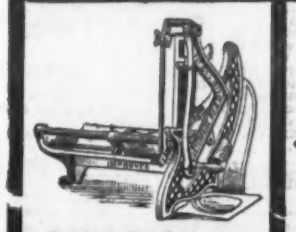
ENTERPRISE MANUFACTURING CO. OF PA.,
THIRD & DAUPHIN STS, PHILADELPHIA, PA.

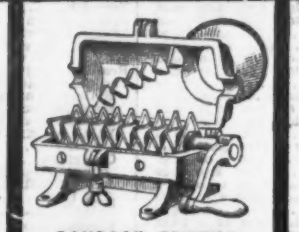

MRS. POTTS'
Cold Handle Double Pointed Sad Irons.

Tincture Presses,
Self-Weighing
Cheese Knife,
Cork Presses.

THE BEST
ARE THE
CHEAPEST.

SOLD BY HARDWARE DEALERS.
SEND FOR ILLUSTRATED CATALOGUE, FREE.


Smoked Beef Shaver.


SAUSAGE CUTTER.


Bung Hole Borer.

Tobacco & Root Cutter.

THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

AND

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES: New Britain, Connecticut.

WAREHOUSE: 79 Chambers St., New York.

THE RICHARDS HOUSE-DOOR HANGER

FOR SLIDING DOORS.

They are simple to hang, massive and strong, without a single weak point. Adaptable to all widths of doors from two to twelve feet, single or double, and require no track on the floor. The only absolutely anti-friction top hanger in the market. There are no plates to mortise in; no matching of hardware, and no defacing of doors. The trade are required to carry but one size in stock, the run being about forty inches longer than the largest sheave upon the market. Every set guaranteed. Write for quotations.

MANUFACTURED BY

WILCOX MFG. COMPANY,

AURORA, ILL.

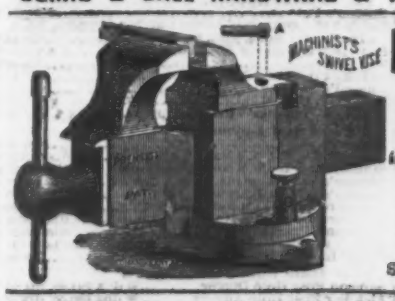
Bemis & Call Hardware & Tool Co.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.



PRENTISS' PAT. VISES,

Adjustable Jaw.

Stationary or Pat. Swivel Bottoms.

ADAPTED TO ALL KINDS OF VISE WORK. ALSO

"PEERLESS" SWIVEL PIPE GRIP,

FITS ANY VISE. SOLD BY THE TRADE.

PRENTISS VISE CO.,

93 Dey Street, New York.

SOLE PROPRIETORS. SEND FOR CIRCULAR.

BARB WIRE MACHINERY.

We have made the Inventing and Manufacturing of this class of Machinery

A SPECIALTY

for eight years, and have the Largest and Best Facilities of any Manufactory in the country.

Will be pleased to give Estimates on receipt of Sample Barb.

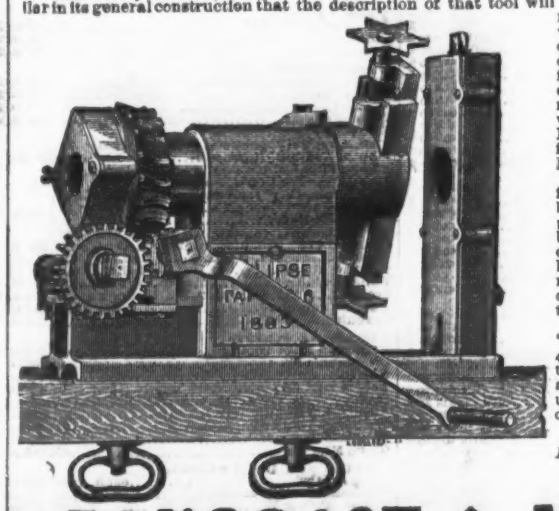
STOVER MFG. CO.,

FREEPORT, ILL.

THE

"Junior" Eclipse Pipe-Cutting Machine

This Tool possesses all the advantages of the larger size "Eclipse" Machine, and is so similar in its general construction that the description of that tool will serve for the "Junior" also. It meets the requirements of those who have use for a Screwing Machine light enough to be readily carried about, sufficiently powerful in its gearing (18 to 1) to work easily, and strong enough to bear rough usage. All of these points, with the very important one of MODERATE COST, are to be found in the **"Junior" Eclipse Machine.**



It will cut off and thread Pipes from ⅛ to 2-inch, inclusive; can be erected on any fence, box or plank in five minutes by simply boring two ⅜ holes, and weighs, complete, about 125 pounds. It has no complicated parts and nothing to break or get out of order, and will do the work of a tool costing twice its price.

We offer it, as also the large size "Eclipse" (cutting pipes 2½ to 4 inch), with the understanding that if not found satisfactory after a fair trial it may be returned to us within thirty days and the purchase money will be refunded.

PRICE, Complete with Dies 1-4 to 2 inches, $60.

PANCOAST & MAULE,

248 & 245 So. Third St., PHILADELPHIA.

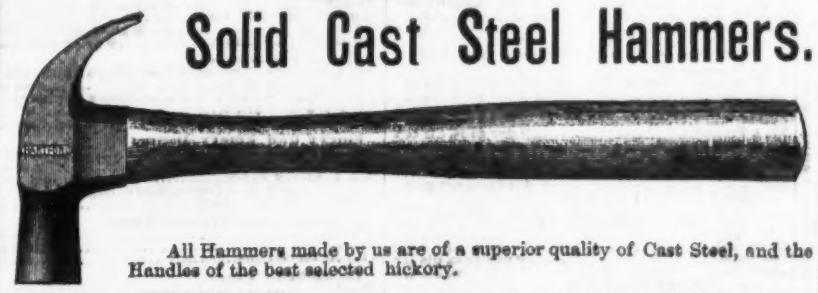
THE

HARTFORD HAMMER CO.,

HARTFORD, CONN., U. S. A.,

MANUFACTURERS OF

Solid Cast Steel Hammers.



All Hammers made by us are of a superior quality of Cast Steel, and the Handles of the best selected hickory.

Desiring to put the best Hammer on the market, each one is thoroughly tested before leaving the factory, and those stamped "HARTFORD" are warranted.

WE WOULD CALL SPECIAL ATTENTION TO OUR

ADZE-EYE BALL PENE,

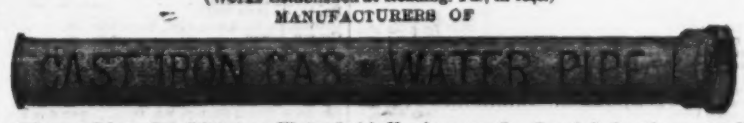
being the only Machinist Hammer with an elongated socket, which socket gives greater bearing to the handle than the ordinary trade hammer, and improves the appearance as well as to its great advantage.

Having lately added to our machinery, we can fill orders promptly, and invite inquiries for discounts.

MELLERT FOUNDRY & MACHINE CO., LIMITED.

(Works Established at Reading, Pa., in 1842.)

MANUFACTURERS OF



Also Flange Pipe, for Steam or Water, of all sizes used. Special Castings, such as Branches, Bends, Reducers, Sleeves, &c. Stop Valves, Fire Hydrants, Retorts, Lamp Posts, &c.

The Improved Canada Turbine Water Wheel.

MACHINERY AND CASTINGS FOR

Furnaces, Rolling Mills, Mining Pumps, Hoists, &c.

CAR CASTINGS, GIRDERS, COLUMNS, BRACKETS, IRON RAILING, &c., &c.

GENERAL OFFICE AT READING, PA.

ROOF CRESTING AND FINIALS,

Weather Vanes, Tower Ornaments, &c.

WROUGHT IRON FENCES,

Iron Shutters, Window Guards, Jail Work, &c.,

BANK AND OFFICE RAILINGS,

WIRE and IRON WORK of Every Description.

☞ Send for Catalogue stating your wants, and we will make estimate. Mention this paper.

THE E. T. BARNUM WIRE & IRON WORKS,

Detroit, Mich., U. S. A.

Henderson's Patent Gas Furnace,

Realizes Perfect Utilization of Coal as Fuel,

PRODUCES INGOT IRON FREE OF CARBON and INGOT STEEL OF ALL GRADES OF CARBON,

From every kind of Pig Iron or Pig and Wrought Scrap Iron.

Apply to JAMES HENDERSON,

BELLEFONTE, CENTRE CO., PA.

THE CLARK M'F'G CO. MANUFACTURERS OF BUILDERS' HARDWARE BUFFALO, N.Y.

Ringers for Rings can be had of Holders for Holders.

CHAMBERS, DERRING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

PERFECTION WINDOW CLEANER.

Simple, Useful & Durable.

Saves 75 per cent. in time and labor over any other method.

This is the only perfect Glass and Window Cleaner yet devised. It has

TWO RUBBER STRIPS,

One an elastic cleaning edge, the other a yielding cushion or support. Has hollow iron handles to attach to pole.

We own all the Patents

embracing any or all of these principle and shall prosecute parties found infringing, either by manufacture or sale of any other **Rubber Window Cleaner.**

Buy only the PERFECTION,

and you escape all infringements. See that our stamp and dates of patents are on every cleaner.

PERFECTION WINDOW CLEANER CO.,

232 La Salle St., CHICAGO, ILL.

EMPIRE NUT CO.
PITTSBURGH, PA.
Hot Pressed
NUTS.
Small Sizes a Specialty

Grindstones, Emery, &c.

Walter R. Wood GRINDSTONES.

Berea, O., Nova Scotia, & other brands.

283 and 285 Front Street, New York.

GEO. CHASE,

The largest manufacturers in the world of

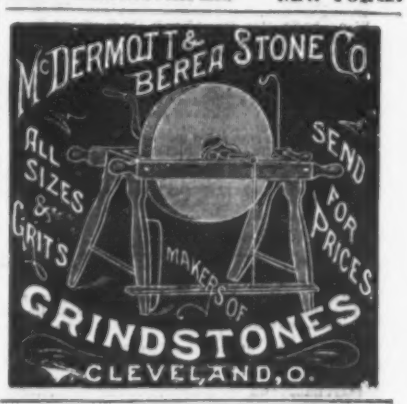
OIL 

STONE

Of all description.

107th Street and Harlem River.

Send for Illustrated Price List. NEW YORK.



OHIO GRINDSTONE COMPANY

JAMES NICHOLL, Prest. L. P. HALDEMAN, Secy.
J. M. WORTHINGTON, V. Pt. B. P. FOSTER, Treas.

Manufacturers of

GRINDSTONES

Of All Kinds.

127 Superior Street,

CLEVELAND, OHIO

New York Wholesale Prices, July 3, 1883.

HARDWARE.

Anvils.
Eagle Anvils American.......... ℔ 10c—dis 20 %
Wright's.......... 11c @ 11½c
Armitage's Mouse Hole.......... 9½c @ 9¾c
Armitage's Mouse Hole (extra quality).......... 11½
Trenton.......... 10½c
Wilkinson's.......... 10½c

Anvil Vise and Drill.
Millers Falls Co., $18.00.......... dis 30 %
Cheney Anvil and Vise.......... dis 33⅓ %

Augers and Bits.
Conn. Valley Mfg. Co.; Douglass Mfg. Co.; C. E. Jennings & Co.; Humphreysville Mfg. Co.; Ives; Beecher (French, Swift & Co.); Griswold; Nobles Mfg. Co.; Snell Mfg. .... dis 45&10 % from list of Jan. 7, 1880.
Watrous & Co. Extension Lip.......... dis 35 %
Cook's Douglass Mfg. Co.......... dis 40&10 %
Patent Solid Head.......... dis 30 %
Lewis' Patent Single Twist.......... dis 45 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand Rail bits.......... dis 10&10&10 %
Russell Jennings' Augers.......... dis 16⅔&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers.......... dis 25&10&10&10 %
Imitation Jennings' Bits.......... dis 50 %
Ives' "Jennings'" Bits.......... dis 40&10 %
Snell Mfg. Co.'s Jennings' Bits.......... dis 40 %
Expansive Bits, Clark's, small, $18; large, $26.. dis 25 %
Expansive Bits, Ives'.......... $20 @ $30—dis 33⅓&10 %
Expansive Bits, Blake's.......... $20—dis 40 %
Expansive Bits, Derby, $17 and $26.......... dis 40 %
Hollow Augers, Ives'; Hollow Augers, French, Swift & Co. .... dis 25 %
Hollow Augers, Douglass'.......... 25 %
Hollow Augers, Bonney's Adjust. ℔ dz. $48—dis 25&10 %
Hollow Augers, Stearns' Adjust. ℔ dz. $48—dis 20&10 %
Hollow Augers, Ives' Expansive, each $4.50—dis 30&10 %
Hollow Augers, Universal Expan., each $4.50—dis 20 %
Wood's.......... dis 25 %
Gimlet Bits.......... $7.50 ℔ gross, dis 50
Gimlet Bits, Diamond.......... ℔ doz. $1.10, dis 25&10 %
Gimlet Bits "Bee".......... dis 25 %
Double Cut Gimlet Bits, Shepardson's.......... dis 40 %
Double Cut Gimlet Bits, Ct. Valley Mfg. Co. dis 40&10 %
Double Cut Gimlet Bits, Hartwell's.......... dis 60 %
Double Cut Gimlet Bits, Douglass'.......... dis 40 %
Double Cut Gimlet Bits, Ives'.......... dis 50 %
Morse's Bit Stock Drill.......... dis 25&10 %
Holts Bit Stock Drills.......... dis 25&10 %
L'Hommedieu's Ship Augers.......... dis 15 %

Awl Hafts.
Sewing, Brass Ferrule.......... $3.50 ℔ gross—dis 40&10
Patent Sewing, Short.......... $1.00 ℔ doz.—dis 40&10 %
Patent Sewing, Long.......... $1.20 ℔ doz.—net
Patent Peg, Plain Top.......... $10.00 ℔ gross—dis 40&10
Patent Peg, Leather Top.......... $12.00 ℔ gross—dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common.......... ℔ gross $1.70—dis 25&10 %
Awls, Shouldered Peg.......... ℔ gross $2.45—dis 25&10 %
Awls, Patent Peg.......... ℔ gross 60c—dis 25&10 %
Awls, Shouldered Brad.......... ℔ gross $2.70—dis 25&10 %
Awls, Handled Brad.......... $7.50 ℔ gross—dis 25&10 %
Awls, Handled Scratch.......... $7.50 ℔ gross—dis 25&10 %
Awls, Socket Scratch.......... $1.50 ℔ gross—dis 10&10 %
Brad Sets, Aiken's.......... ℔ doz $12.00—dis 45&10 %
Millers Falls Adj. Tool Hdles.......... ℔ doz $12—dis 25 %
Brad Sets, No. 42, $10.50; No. 43, $12.50.......... dis 70&10 %
Brad Sets, Stanley's Excelsior, No. 1, $9.60... dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 2, $1.80... dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 3, $7.80... dis 30&10 %

Axes.
Single Bit, 4½ to 5½ and under.......... ℔ doz $8.00 net
Single Bit, 4½ to 6 and over.......... ℔ doz $8.50 net
Single Bit, beveled.......... 50c ℔ doz advance
Double Bit, 4½ to 5½ and under.......... ℔ doz $15.00 net
Double Bit, 4½ to 6 and over.......... ℔ doz $16.00 net
Double Bit, beveled.......... $1.00 ℔ doz advance

Axle Grease.
Frazer's.......... ℔ ℔ 6c

Axles.
Standard list.......... dis 45 %

Balances.
Spring Balances.......... dis 33⅓ %

Bells.
Hand, Light Brass.......... dis 65&10 @ 70 %
Hand, Extra Heavy.......... dis 45 %
Hand, White Metal.......... dis 60 %
Hand, Silver Chime.......... dis 20&10 %
Hand, Globe (Cone's Patent).......... dis 25&10 %
Gong, Abbe's.......... dis 20&10 %
Gong, Yankee.......... dis 30&10 %
Gong, Barton's.......... dis 30&10 %
Crank, Taylor's.......... dis 25&10 %
Crank, Brooks'.......... dis 50&10&2 %
Crank, Cone's.......... dis 10 %
Crank, Connel's.......... dis 15&10 %
Lever, Sargent's.......... dis 55&10 %
Lever, Taylor's Bronzed or Plated.......... net
Lever, Taylor's Japanned.......... dis 25&10 %
Lever, R. & E. M. Co.'s.......... dis 50&10&2 %
Lever, Reading.......... dis 25&10&10 %
Pull, Brook's.......... dis 50&10&2 %
Pull, Western.......... dis 25&10 %
Call.......... dis 25 %
Cow, Common Wrought.......... dis 55&10 %
Cow, Western.......... dis 20&10 %
Cow, Western, Sargent's list.......... dis 55&10 %
Cow, Kentucky "Star".......... dis 20&10 %
Cow, Kentucky Sargent's list.......... dis 55&10 %
Cow, Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog
	$12.00	10.0	9.0	8.00	7.00	5.00	3.50	2.50	5.00

dis 60 %
Cow, Texas Star.......... dis 40&10 %

Bellows.
Blacksmiths' Common.......... dis 45 %
Blacksmiths' Extra Pittsburgh Pattern.......... dis 20 %
Molders'.......... dis 25 %
Hand Bellows.......... dis 20 %

Belting, Rubber.
Belting and Packing Co.......... dis 50 %

Bit Holders.
Extension, Barber's.......... ℔ doz $15.00—dis 40&5 %
Extension, Ives'.......... ℔ doz $15.00—dis 40 %
Diagonal.......... ℔ doz $24.00—dis 40 %
Angular.......... ℔ doz $24.00—dis 40 %

Blind Adjusters.—Domestic.. ℔ doz $3.00—dis 30 %
Excelsior.......... ℔ doz $16.00—dis 50&10&2 %

Blind Fasteners.
Mackrell's.......... ℔ doz pairs. $1.00 dis 20&10 %
Van Sand's Screw Pattern.......... $9 ℔ gro. dis 10&2 %
Van Sand's Old Pattern.......... $9 ℔ gro. dis 10&2 %
Washburn's Old Pattern.......... $9 ℔ gro. net
Merriman's.......... new list, net
Salisbury & Austin, No. 2008.......... $9 per gro. net
Security Gravity.......... $9 per gross. net

Blind Staples.
Bar bed, ½ in. and larger.......... ℔ ℔ 11c net
Bar bed ⅜ in.......... ℔ ℔ 13c net

Blocks.
Penfield Block Co., I. R. and I. Strap'd.......... New List dis 35 %
Penfield Block Co., W. I. C. bushed.......... dis 35 %
Penfield Block Co., W. I. all steel roll'r.......... dis 20 %
Penfield Block Co., L. & I Sheaves.......... dis 35 %
Stanley Rule & Level Co.'s.......... dis 40&10 %

Bolts.
Cast Iron Barrel Shutter, &c.......... dis 55&10 %
Cast Iron Chain (Sargent's list).......... dis 60&10 %
Ives' Patent Door Bolts.......... dis 60&10 %
Wrought Barrel.......... dis 55&10 %
Wrought Square.......... dis 55&10 %
Wrought Shutter, all Iron, Stanley's list.... dis 50&10 %
Wrought Shutter, Brass Knob, Stanley's list. dis 50&10 %
Wrought Shutter, Sargent's list.......... dis 55&10 %
Wrought Sunk Flush, Sargent's.......... dis 75&10 %
Wrought Sunk Flush, Stanley's.......... dis 40&10 %
Wrought B. K. Flush, Com'n Stanley's.......... dis 55&2½ %
Carriage and Tire Common.......... dis 80@80&10 %
Carriage and Tire, Philadelphia, new list.......... dis 70 %
Carriage and Tire, Philadelphia Pattern.......... dis 70 %
Union Carriage.......... dis 70 %
R. B. & W. Carriage (old list).......... dis 65 %
Tire, Am. Screw Co.'s, Phila.......... dis 75 %
Tire, "Bay State".......... dis 80&5 %
Tire, R. B. & W., new list.......... dis 75&10 %
Stove—American Screw Co.'s.......... dis 40
Stove, R. B. & W.......... dis 40 %
Stove, R. & E. Mfg. Co.......... dis 40 %
Plow.......... dis 50 %
Plow, R. B. & Co.......... dis 50 %
Machine.......... dis 65&10 %
Bolt Ends.......... dis 60&10 %

Borax........... 10c ℔ ℔ net

Boring Machines.

	Upright	Angular	
First quality no Augers	$5.50	$6.75	dis 45@50 %
Phillips, with Augers	7.00	7.50	net
Jennings & Co., no Augers	5.50	6.75	dis 40 %

Saunders' Patent, Regular Bed, $6.00.......... dis 20 %
Saunders' Patent, Extra Bed, $6.50.......... dis 20 %

Boxes.
Interchangeable Shelf Boxes.......... dis 20 %

Braces.
Q. S. Backus.......... dis 50@60 %
Wilson Mfg. Co.......... dis 10 %
Barber's.......... dis 40&5 %
Spofford's Patent.......... dis 50&5 %
Ives' Patent Braces.......... dis 55@55&5 %
Common Ball (American).......... dis 55 %
Amidon's.......... dis 30 %
Barker's Imp'd.......... dis 10 %
Empire.......... dis 30 %
Buffalo Ball.......... dis 40 %

Brackets.
Shelf, plain.......... dis 50&10 %
Shelf, fancy.......... dis 60&10 %
Reading, Plain.......... dis 25&10 %
Reading, Rosette.......... dis 60&10 %

Bright Wire Goods. List of June 25, '83. dis 70&10 %

Bull Rings.
Union Nut Co.......... dis 55 %
Sargent's.......... dis 60&10 %
Hotchkiss' low list.......... dis 15 %
Humason, Beckley & Co.'s.......... dis 60&10 %
Peck, Stow & W. Co.'s.......... dis [illegible]

Butts.
Wrought Brass.......... dis 60&10 %
[illegible]

Cast Brass, Corbin's Fast Joint.......... dis 20&10 %
Cast Brass, Loose Joint.......... dis 10&10 %
Fast Joint, Narrow.......... dis 45&10 %
Fast Joint, Broad.......... dis 45&10 %
Loose Joint.......... dis 55&10 %
Loose Joint, Japanned.......... dis 55&10 %
Loose Joint, Japanned with Acorns.......... dis 55&10 %
Parliament Butts.......... dis 55&10 %
Mayer's Hinges.......... dis 60&10 %
Loose Pin, no Acorn.......... dis 50&10 %
Loose Pin, Acorns.......... dis 50&10 %
Loose Pin, Acorns, Japanned.......... dis 60&10 %
Loose Pin, Acorns, Japanned, Plated Tips.. dis 60&10 %

WROUGHT IRON.

Fast Joint, Narrow.......... dis 50&10 %
Fast Joint, Lt. Narrow.......... dis 50&10 %
Fast Joint, Broad.......... dis 50&10 %
Loose Joint, Broad.......... dis 55&10 %
Table Butts, Back Flaps, &c.......... dis 50&10 %
Inside Blind Regular.......... dis 40&10 %
Inside Blind, Light.......... dis 40&10 %
Loose Pin, Wrt.......... dis 55&10 %
Loose Pin, Light.......... dis 50&10 %
Spring Hinges:
Geer's Spring and Blank Butts.......... dis 33⅓ %
Sabin Mfg. Co.'s Double Acting.......... dis 45 %
Union Spiral Spring, Japanned.......... dis 25 %
Union Spring Hinge Co.'s.......... dis 25 %
American Spring Hinge Co.'s.......... dis 30 %
Gem Spring Hinges.......... dis 30 %
Barker's Double Acting.......... dis 20 %
Union Mfg. Co.......... dis 25 %
Bommer's.......... dis 25 %
Buckman's.......... dis 25 %
Empire.......... dis 50&10 %
Acme.......... dis 65&10 %
Climax.......... dis 50&10 %
Blind Butts, Parker.......... dis 70&2 %
Blind Butts, Palmer.......... dis 45&10 %
Blind Butts, Seymour.......... dis 70 %
Blind Butts, Lull & Porter.......... dis 70&10 %
Blind Butts, Nicholson.......... dis 45&10 %
Blind Butts, Huffer.......... dis 40 %
Blind Butts, Clark's, Nos. 1, 3, 5.......... dis 70&2 %
Blind Butts, Sargent's, Nos. 1, 3.......... dis 50&10&10 %
Blind Butts, Sargent's, No. 12.......... dis 70&10 %
Blind Butts, Reading's Gravity.......... dis 66⅔&10 %
Blind Butts, Shepard's "Noiseless," Nos. 40, 60, 65, 45 and 55.......... dis 70 %
Blind Butts, Shepard's "Noiseless," Nos. 050 and 060.......... dis 70&10 %
Shepard's Lull & Porter Shutter Hinges.......... dis 70&10 %
Shepard's Reversible Shutter Hinges.......... dis 70&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3.......... dis 60&10 %

Bow Pins.
Humason, Beckley & Co.'s, Nos. 1 and 2.......... dis 60 %
Humason, Beckley & Co.'s other Nos..... dis 66⅔&10 %
Sargent & Co.'s.......... $19.70 and $21.40, dis 66⅔&10 %
Hotchkiss.......... dis 25 %
Peck, Stow & W. Co.......... dis 50&10 %

Butcher's Cleavers.
Humason & Beckley Mfg. Co.......... dis 25 %
Bradley's.......... dis 5
Beatty's.......... dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	10.00	21.50	24.00	27.00	30.00	33.50	36.50

Can Openers.
Messenger's Comet.......... ℔ doz $3.00, dis 25
American.......... ℔ gross $6.00, dis 25 %
Duplex.......... ℔ doz 25c, dis 15@20 %
Lyman's.......... ℔ doz $3.75, dis 20 %
No. 4, French.......... ℔ doz $2.25, dis 55 %
No. 5, Iron Handle.......... ℔ gross $9.00, dis 25 %
Eureka.......... ℔ doz $2.50, dis 10 %
Sardine Scissors.......... ℔ doz $7.00, dis 55 %
Star.......... ℔ doz $5.00, dis 25&5 %
Sprague, No. 1, $2.00; No. 2, $2.25; No. 3, $2.50.......... dis 50&10 %
"World's Best" ℔ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $30.00.......... dis 50 & 10 %
Universal.......... ℔ doz $2.00, dis 35 %
Domestic.......... ℔ doz $2.50, dis 45 %
Champion.......... ℔ doz $2.00, dis 50 %

Caps—Percussion, ℔ 1000.
Hicks & Goldmark's
F. L. Waterproof, 1-10's.......... 50c
E. B. Trimmed Edge, 1-10's.......... 65c
E. B. Ground Tr'md Edge, Central Fire, 1-10's.. 7.0c
Pistol Waterproof, extra heavy, 1-10's.......... $1.10
Musket Caps, 1-10's.......... 80c
(dis 10&10 % on Hicks & Goldmark's)
U. M. C., F. C. trimmed.......... 50c; U. M. C., F. L. ground.......... 70c — dis 10&10 %
U. M. C., Cen. fire ground.......... 70c; U. M. C., Double W. Proof.......... $1.40 — dis 10&5 %
G. D. & S. B.......... 33c, dis 10 %
Double Waterproof, in 1-10's.......... $1.40; Colt's Pistol, in 1-10's.......... 75c — dis 10 %
F. L.......... 50c; E. B. 1-10, trimmed.......... 65c; E. B. 1-10, ground edge.......... 70c — dis 10&5 %
Musket, in 1-10's.......... 80c, dis 25 %

Cartridges.—Rim.......... dis 75&5 %
Central Fire.......... dis 45 %

Cards.—Horse and Curry.new list, July, '81, dis 10 %
Cotton.......... new list, July, '81, dis 10 %
Wool.......... new list, July, '81, dis 10 %

Carpet Stretchers.
Cast Steel, Polished.......... ℔ doz $5.00, dis 30 %
Cast Iron, Steel Points.......... ℔ doz $2.00, dis 50&5 %
Socket.......... ℔ doz $2.50, dis 25 %
Bullard's.......... dis 25 %

Casters.—Bed.......... dis 45@50 %
Plate.......... 45@50 %
Shallow Socket.......... dis 35&10 %
Deep Socket.......... dis 25&10 %
Martin's Patent (Phoenix).......... dis 25 %

Cattle Leaders.
Humason, Beckley & Co.'s.......... dis 70&10 %
Sargent's.......... dis 70&10 %
Hotchkiss.......... dis 25 %
Peck, Stow & W. Co.......... dis 33⅓&10 %

Chain.
Trace, 6½-10-2.......... ℔ pair 70c; Trace, 6½-10-3.......... ℔ pair 70c; Trace, 7-10-2.......... ℔ pair 86c — dis 35 %
German Halter Chain, list of Dec. 31, 1881.......... dis 50 %
German Coil, list of Dec. 31, 1881.......... dis 50 %
Covert Halter, Hitching and Breast.......... dis 35&5 %
Oneida Halter Chain (old list).......... dis 45 %
Galvanized Pump Chain.......... ℔ ℔ 9½c net
Jack Chain, Iron.......... dis 60&10 %
Jack Chain, Brass.......... dis 50&10 %

Chalk.
White.......... ℔ gross 60c net
Red.......... ℔ gross 80c net
Blue.......... ℔ gross $1.00 net
White Crayons.......... ℔ gross 11c net

Chalk Lines.—See Lines

Chisels.
Socket Framing, Crossman.......... dis 65&5 %
Socket Framing, Arlington Edge Tool Co.... dis 65&10 %
Socket Framing, Buck Bros.......... 1876 list, dis 22½ %
Socket Framing, Merrill.......... dis 65&10 %
Socket Framing, Witherby Tool Co.......... dis 65&10 %
Socket Framing, Douglass'.......... dis 65&10 %
Socket Firmers, Crossman.......... dis 65&5 %
Socket Firmers, Arlington Edge Tool Co.... dis 65&10 %
Socket Firmers, Buck Bros.......... 1876 list, dis 22½ %
Socket Firmers, Merrill.......... dis 65&10 %
Socket Firmers, Witherby Tool Co.......... dis 65&10 %
Socket Firmers, Douglass'.......... dis 65&10 %
Socket Corner.......... dis 65&10 %
Tanged Firmers.......... dis 40@45 %
Tanged Firmers, Butcher's.......... $5.00@$5.25 to £
Tanged Firmers, Spear & Jackson's.......... 5.00 to £
Tanged Firmers, Buck Bros (Shank).......... 5.25 to £
Globe Mfg. Co.......... dis 65&10 %

Clamps.
Iron, Providence Tool Co.'s Wrt. Iron.......... dis 25 %
Iron, Adjustable, Gray's.......... dis 20 %
Iron, Adjustable, Lambert's.......... dis 20 %
Iron, Adjustable, Snow's.......... dis 40&5 %
Iron, Adjustable, Hammer's.......... dis 15 %
Iron, Adjustable, Stearns'.......... dis 20&10 %
Iron, Cabinet, Sargent's.......... dis 70&10 %
Iron, Carriage Makers', Sargent's.......... dis 65&10 %

Clips, Axle.
Norway or Best.......... dis 60&5 %
Superior.......... dis 65&5 %

Cockeyes........... dis 55 %

Cocks, Brass.
Racking, new list, July 10, 1880; Globe, new list, July 10, 1880; Plain Bibbs, new list, July 10, 1880; Ale and Beer, new list, July 10, 1880.......... dis. ...45 %

Coffee Mills.
Board and Box.......... dis 45 %
Wilson's.......... dis 45 %
Selsor's Flat.......... $9.50, $10.50, dis 45 %
American (Enterprise Mfg. Co.).......... dis 20&10 %
The "Swift" (Lane Bros.).......... dis 20&10 %
Webb's Patent.......... dis 45 %

Combined Dinner Pail and Lantern.
Per doz $15.00.......... dis 30 %

Compasses, Dividers, &c.
Compasses.......... dis 55 %
Calipers.......... dis 55 %
Dividers.......... dis 55 %
Bemis & Call Co.'s Dividers.......... dis 60&5 %
Bemis & Call Co.'s Compasses and Callipers.. dis 50&5 %
Bemis & Call Co.'s Wing & inside or outside.. dis 50&5 %
Bemis & Call Co.'s Double.......... dis 60 %
Bemis & Call Co.'s (Call's Patent Inside).......... dis 30 %
Excelsior.......... dis 60 %
Cook's Extension.......... dis 25 %

Coopers' Tools.
Bradley's.......... dis 10 @ 20 %
Barton's.......... dis 20 %

Corkscrews.—Humason & Beckly Mfg. Co. dis 33⅓ %
Clough's Pat.......... dis 33⅓ %

Corn Knives and Cutters.—Bradley's.......... dis 10 %
Wadsworth's.......... dis 25 %

Crow Bars.
Cast Steel.......... ℔ ℔ 6½c
Iron, Steel Points.......... ℔ ℔ 5 c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80, 2.00, 2.40.......... dis 10 %
Curling Tongs.......... ℔ doz $3.65, dis 10 %
Pinching Irons.......... ℔ doz $7.50, dis 20 %

Curry Combs.
Fitch's.......... dis 50&10 %
Hotchkiss, Novelty, new list, July 1880.......... dis 25 %
Hotchkiss, Excir. Supr. Champion.......... dis 25 %
Rubber.......... ℔ doz $10.00, dis 25 %

Curtain Pins.
Silvered Glass.......... net
White Enamel.......... net

Cutlery.
Meriden Cutlery Co. (Table).......... net
Am. Miller Bro.'s Cutlery Co.......... dis [illegible]
Humason & Beckley, Pocket.......... dis [illegible]
Naugatuck Cutlery Co.......... [illegible]
Aaron Burkinshaw's Pocket.......... [illegible]

Dog Collars.
Embossed Gilt.......... dis 30&10 %
Leather.......... dis 40 %
Brass.......... dis 40 %

Door Springs.
Torrey's Rod, regular size, ℔ doz., $3.......... dis 50 %
Gray's Rod.......... dis 15 %
Bee Rod.......... dis 15 %
Warner's.......... dis 30 %
Gem (Coil):
No. 1, Large Japanned.......... ℔ doz $4.00; No. 2, Medium, Japanned.......... ℔ doz 2.75; No. 3, Small, Japanned.......... ℔ doz 2.00 — dis 50 & 10 %
Star (Coil)—For Cop'd, Nickel-Plated &c., see list.
No. 4 ("Shoo Fly") Screen door size, ℔ doz $1.50; No. 5, Screen Door size.......... ℔ doz 2.00; No. 6, Medium.......... ℔ doz 2.75; No. 7, Large.......... ℔ doz 4.00 — dis 60 %
Sabin's Lever.. No. 1, $1; 2, $1.50; 3, $2; 4, $2.50. dis 35 %
Sabin's Boss. No. 1, ℔ doz. $4.00; 2, $2.75; 3, $2. dis 33⅓ %
Sabin's Crown.......... ℔ doz $1.50. dis 33⅓ %
Philadelphia.......... 5 in., $5.00; 8 in., $7.75, dis 35 %
Cowell's.......... No. 1, ℔ doz. $18.00; No. 2, $15.00, dis 50 %
Rubber, complete.......... ℔ doz. $1.80, dis 10 %
Hercules.......... dis 50 %

Drawing Knives.
Arlington Edge Tool Co.......... dis 65&10 %
Crossman's No. 1.......... dis 65&5 %
Morrill.......... dis 65&10 %
Nobles Mfg. Co.......... dis 15 %
Bradley's.......... dis 35 %
Adjustable Handle.......... dis 20 %
Witherby Tool Co.......... dis 65&10 %
Douglass.......... dis 65&10 %
Globe Mfg. Co.......... dis 65&10 %

Drills and Drill Stocks.
Blacksmiths'.......... each, $2.50, dis 10 %
Blacksmiths' Self-Feeding.......... each, $7.50, dis 20 %
Breast, P. S. & W.......... dis 20&10 %
Breast, Hotchkiss'.......... dis 20 %
Breast, Wilson's.......... dis 20 %
Breast, Millers Falls.......... each, $3.00, dis 25 %
Breast, Bartholomew's.......... each, $2.50, dis 25&10 %
Ratchet, Merrill's.......... dis 10 %
Ratchet, Ingersoll's.......... dis 25 %
Ratchet, Whitney's.......... dis 20 %
Ratchet, Weston's.......... dis 20 %
Ratchet, Moore's Triple Action.......... dis 20&25 %
Whitney's Hand Drill, Plain, $11.00 Adjustable, $12.00.......... dis %
Wilson's Drill Stocks.......... dis 10 %
Automatic Boring Tools.......... each, $2.25, dis 20 %

Drill Chucks.
Morse's Beach Patent.......... dis 30 %
Morse's Adjustable.......... each, $10.00, dis 30 %
Danbury.......... each, $8.00, dis 30 %

Egg Beaters.
Dover.......... ℔ doz. $2.50, dis 2 %
Monroe's.......... dis 50 %
National.......... ℔ doz. $4.50, dis 33⅓ %
Standard.......... ℔ gross, $18.00, dis 25 %
Family (T. & S. Mfg. Co.).......... ℔ gross, $18.00, net
Acme.......... ℔ gross, $12.00, dis 25 %
Triumph (T. & S. Mfg. Co.).......... ℔ gross, $11.50, net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved), ℔ 100, $15.00 @ $54.00.......... dis 10 %
Mill E. Buckets, heavy 5 to 10 in. (Duc's Improved), ℔ doz. $4.60 @ $10.20.......... dis 10 %
Storehouse (Duc's Patent), 12 to 17, $12 @ $20.... dis 10 %

Emery and Emery Paper.
Regular numbers.......... ℔ ℔ 6c
Flour and F. F.......... ℔ ℔ 4c
B. & A. Emery Paper.......... dis 30&5 %
Sibley's Emery and Crocus Cloth, large size, $10; medium, $10.50 ℔ ream.......... dis 15 %

Enameled and Tinned Ware.
Kettles.......... dis 50 %
Sauce Pans.......... dis 25 %
Tinned Sauce Pans.......... dis 25 %

Escutcheon Pins.
Brass.......... dis 50 %

Escutcheons.
Door Lock.......... Same discounts as Door Locks
Brass Thread.......... dis 55 %
Wood.......... dis 25 %

Faucets.
Fenn's.......... dis 40 %
Bohren's Patent Rubber Ball.......... dis 25 %
Fenn's Cork Stops.......... dis 33⅓ %
Star.......... dis 55&10 %
Frary's Patent Petroleum.......... dis 20&10 %
West's Patent Key.......... dis 45 %
Anchor Lock.......... dis 45 %
Metallic Key, Leather Lined.......... dis 60 %
Cork Lined.......... dis 70 %
J. Sommer's Best Metallic Key.......... dis 40&10 %
J. Sommer's Cork Lined, 1st quality.......... dis 50 %
Self-Measuring, Enterprise.... ℔ doz. $30.00, dis 20&10 %
Self-Measuring, Lane's.......... ℔ doz. $0.00, dis 20&10 %
Self-Measuring, Victor.......... ℔ doz. $36.00, dis 25&10 %

Felloe Plates........... ℔ ℔, 10c, dis 25 %

Files.
J. & Riley Carr.......... new list April 1, '83, dis 15 %
J. & Riley Carr Horse Rasps.......... dis 10 %
Butcher's..........
Moss & Gamble.......... new list, dis 15 %
H. Disston & Sons.......... dis 45 %
Nicholson.......... dis 45 %
New American.......... dis 45 %
Union File Co.......... dis 45 %
Heller Bros.' Files.......... dis 45 %
Heller Bros.' Horse Rasps.......... dis 35 %
Stubs.......... new list, dis 25@30 %

Fluting Machines.
Knox, 4½-inch Rolls.......... $3.50 each; Knox, 6-inch Rolls.......... $4.00 each — dis 25 %
Eagle, 3½-inch Roll.......... $2.15, dis 25 %
Eagle, 5½-inch Roll.......... 2.85, dis 25 %
Crown, 4½-in., $3.50; 6-in., $4.00; 8-in., $6.50 each, dis 25 %
Crown Jewel.......... 6-in., $3.40 each, dis 25 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 25 %
Domestic Fluter.......... $1.50 each, net
Geneva Hand Fluter, White Metal.. ℔ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00 ℔ doz.......... dis 30 %
Shepard Hand Fluter, No. 85.......... per doz $15, dis 40 %
Shepard Hand Fluter, No. 110.......... per doz $8.75, dis 40 %
Shepard Hand Fluter, No. 95.......... per doz $6.50, dis 20 %
Clark's Hand Fluter.......... ℔ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron.... ℔ doz $15.00, dis 30 %
Buffalo.......... ℔ doz $10.00, dis 10 %

Fluting Scissors........... dis 45 %

Fly Traps.
Paragon.......... ℔ doz, $3, net

Forks.
Hay, Manure and Spading.......... dis 50&10 %
Plated, A 1, Rogers & Bro.......... dis 40&10&5 %
Plated, Reed & Barton.......... dis 40&10&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co.......... dis 25 %

Fry Pans.
Burnished list as follows.......... dis 60&10&5 %

No.	0	1	2	3	4	5	6	7	8
℔ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

"Acme".......... dis 40&10 %

Gauges.
Marking Stanley's.......... dis 50&10 %
Marking, Chapin's.......... dis 55&10 %
Wire.......... dis 70&10 %
Wire, Disston's.......... dis 20 %
Wire, Wheeler, Madden & Co.......... dis 10 %

Gimlets.
Nail and Spike.......... dis 40&10 %
"Eureka" Gimlets.......... dis 40&10 %
"Diamond" Gimlets.......... dis 40&10 %
Double Cut, Shepardson's.......... dis 40&10 %
Double Cut, Hartwell's.......... dis 40&10 %
Double Cut, Ives'.......... dis 40&10 %
Double Cut, Douglass'.......... dis 40 %
"Bee".......... ℔ gro. $12.00, dis 25 %

Glue Pots.
Tinned and Enameled.......... dis 25&5 %
Family, Howe's "Eureka".......... dis 25 %
Family, L. F. & C.'s "Handy".......... dis 30 %

Grindstone Fixtures.
Sargents Patent.......... dis 70&10 %
Reading Hardware Co.......... dis 30&10 %

Gun Wads.
U. M. C. B. E., 11 up.......... $2.00
U. M. C. B. E., 9&10.......... 2.30
U. M. C. B. E., 7&8.......... 2.60
U. M. C. P. E., 11 up.......... 3.10
U. M. C. P. E., 9&10.......... 4.00
U. M. C. P. E., 7&8.......... 4.90
dis 5&5 %

Halters.
Covert's Pat. Rope.......... dis 50 %
Horse and Cattle Ties Covert's.......... dis 50 %

Hammers.
Maydole's.......... dis 15 %
Cheney's, new list, March, 1883.......... dis 20&5 %
Hartford Hammer Co. (new list July 1, '81).... dis 20 %
Humason & Beckley.......... dis 15 %
Verree.......... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.26, 1.50 and 1.75. dis 25&10 %
Nelson Tool Works.......... dis 40&10 %
Warner & Noble's.......... dis 5 %
Yerkes & Plumb.......... dis 15 %
Wilkinson's Smiths'.......... 11½c ℔ ℔ net

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ℔ doz. dis 10 %
Providence Tool Co., Leg Irons, $25.00 ℔ doz.......... dis 10 %
Tower's.......... dis 25 %

Handles.—Door or Thumb Latches.

Nos.	0	1	2	3	4
Per doz.	$0.80	1.00	1.18	1.35	1.50

dis 60&10 %
Roggin's Latches.......... ℔ doz 35c @ 40c. net
Bronze Iron Drop Latches.......... ℔ doz $0.90 @ 1.10
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88.......... dis 10 %
Barn Door.......... ℔ doz $1.60, dis 10&10 %
Wrought Chest.......... dis 70 %
Surface Chest.......... dis 60&10 %
Flush Chest.......... dis 60&10 %
Lifting.......... dis 55&10 %
Saw and Plane.......... dis 40&10 %
Boynton's Loop Saw Handles.......... 50c, dis 35 %
Boynton's Centennial Saw Handles.......... 30c, dis 25 %
Hammer and Hatchet.......... dis [illegible]
Brad Awl.......... ℔ gross, $1.50 dis 10 & 10 %

Hickory Firmer Chisel, assorted, ℔ gross.. $4.50
Hickory Firmer Chisel, large, ℔ gross.......... 5.00
Apple Firmer Chisel, assorted, ℔ gross.......... 5.00
Apple Firmer Chisel, large, ℔ gross.......... 6.00
Socket Firmer Chisel, assorted, ℔ gross.......... 3.00
Socket Framing Chisel, assorted, ℔ gross.......... 5.00
File assorted, ℔ gross.......... 2.75
Auger, assorted, ℔ gross.......... 5.00
Auger, large, ℔ gross.......... 7.00
dis 20&10 @ 25&10
Patent Auger, Ives'.......... dis 25 %
Patent Auger, Douglass'.......... ℔ set $1.25 net
Patent Auger, Swan's.......... ℔ set $1.00 net

Hangers.
Barn Door, old patterns.......... dis 60&10 %
Barn Door, New England.......... dis 65&10 %
Climax (Anti-Friction).......... dis 50 %
Challenge.......... dis 50 %
"Champion" Medina Mfg. Co.......... $15; dis 50&10 %
Sterling Improved (Anti Friction).......... dis 65&10 %
Cheritree.......... dis 50 %
Kidder's.......... dis 50&5
U. S.......... 4 in., $12; 5 in., $15; dis 60 %
The "Boss".......... dis 50&10 %
Terry's Patent.......... 5 in., $12; 3½ in., $10; dis 40 %
Cronk.......... No. 4, $12; No. 5, $14.40; No. 6, $21; dis 50 %

Harness Snaps.
Anchor (T. & S. Mfg. Co.).......... dis 60
Henshaw's, list of 1½ changed to $14.00.......... dis 60 %
Judd's, list of 1½ changed to $14.00.......... dis 55&10 %
Fitch's (Bristol), list of 1½ change to $14.00.... dis 55&10 %
Hotchkiss'.......... dis 10 %
Andrews'.......... dis 50 %
Sargent's.......... dis 70&10 %
German, low list, Sep., 1882.......... dis 33⅓ %
German, Sargent's new list.......... dis 60&10 %
Covert.......... dis 50 %
Covered Spring, new list, Oct., 1882.......... dis 60&10 %

Hatchets.
Isaiah Blood.......... dis 30 %

Shingling,	Nos. 1 2 3	℔ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	℔ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	℔ doz	7.50	8.00	8.50

Hunt's.......... dis 25 %

Shingling,	Nos. 1 2 3	℔ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	℔ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	℔ doz	7.30	8.25	9.00

Hurd's.......... dis 30 %

Shingling,	Nos. 1 2 3	℔ doz	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	℔ doz	9.00	9.50	10.00
Lathing,	Nos. 1 2 3	℔ doz	8.00	8.50	9.00

Yerkes & Plumb.......... dis 40 %

Shingling,	Nos. 1 2 3	℔ doz	7.50	$8.00	$8.50
Claw,	Nos. 1 2 3	℔ doz	8.25	8.75	9.25
Lathing,	Nos. 1 2 3	℔ doz	7.50	8.00	8.50

Simmons'.......... dis 50 %

Shingling,	Nos. 0 1 2 3	℔ doz	$7.50	$8.00	$8.50	$9.00
Claw,	Nos. 0 1 2 3	℔ doz	....	8.50	9.00	9.50
Lathing,	Nos. 0 1 2 3	℔ doz	....	8.00	8.50	9.00
Broad,	Nos. 1 2 3 4	℔ doz	9.00	10.00	12.00	14.00
Broad,	Nos. 5 6 7 8	℔ doz	16.00	18.00	20.00	22.00

Collins.......... dis 10

Shingling,	Nos. 1 2 3	℔ doz	$5.50	$6.00	$6.50
Claw,	Nos. 1 2 3	℔ doz	6.00	6.50	7.00
Lathing,	Nos. 1 2 3	℔ doz	5.50	6.00	6.50

Peck's Champion Blade.......... dis 30

Shingling,	Nos. 1 2 3	℔ doz	$8.00	$8.50	$9.00
Lath,	Nos. 1 2 3	℔ doz	8.00	8.50	9.00
Claw,	Nos. 1 2 3	℔ doz	9.00	9.50	10.00
Half,	Nos. 1 2 3	℔ doz	8.00	8.50	9.00
Ax Pattern,	Nos. 1 2 3	℔ doz	10.00	11.00	12.00

Hay Knives.
"Lightning".......... ℔ doz $20.00 dis 10 %
Wadsworth's.......... dis 33⅓ %

Hinges.
Gate, Western.......... ℔ doz $4.00 dis 55 %
Gate, N. E.......... ℔ doz $7.70, dis 55 %
Gate, N. E. Reversible.......... ℔ doz $6.45, dis 55 %
Gate, Clark's, Nos. 1 2 3.......... dis 50 %
Gate, N. Y. State.......... ℔ doz $5.05, dis 45&10 %
Gate, Automatic.......... ℔ doz $12.50, dis 25 %
Gate, Common Sense.......... ℔ doz pair $4.50, dis 50 %
Gate, Seymour's.......... dis 45&10 %
Gate, Shepard's.......... Nos. 1, 2, 3, 10, 20 & 25, dis 50&10 %
Rolled Blind Hinges.......... dis 60&10 %
Rolled Plate.......... dis 60&10 %
Rolled Raised.......... dis 60&10 %
Plate Hinges "Providence" { 8, 10 & 12 in., $5.55 ℔ 100 ℔; over 12 in., $4.50 ℔ 100 ℔ } ..dis 10 %
Screw Hook and Strap { 8, 10, 12 in., $7.00 ℔ 100 ℔; 14 to 36 in. $5.75 ℔ 100 ℔ } ..dis 10 %
Heavy Welded Hook { 8 to 12 in., $7.00 ℔ 100 ℔; 14 in& up, $5.50 ℔ 100 ℔ } dis 10 %
Screw Hook and Eye.......... ⅝ & 1 in. 9c; ¾ in., 9c; ⅝ in., 10c; ½ in., 12c — dis 20 %
Wrought Strap and T.......... dis 55&10 %

Hoes.
Riveted Shank.......... ℔ doz $5.00, dis 55 %
Socket.......... ℔ doz $5.25, dis 55 %
Grub.......... ℔ doz $11 dis 35 %
Planters'.......... dis 50 %
Scovill Pattern.......... dis 50 %
Handled Planters'.......... dis 50&10 %
Hick's Pat. Solid C. S. Planters'.......... dis 20&10&30 %
Hick's Pat. Solid C. S., Scovill Pattern.... dis 20&5&35 %
Winsted & Lane, Planters'.......... dis 25 %
Winsted & Lane, Scovill Pattern.......... dis 20&25 %
Magic.......... ℔ doz $8 net

Hooks.
Bird Cage, Sargent's list.......... dis 60&10 %
Bird Cage, Reading.......... dis 40&10 %
Cotton.......... ℔ doz $4.0, dis 50 %
Cotton Patented (N. Y. Mallet & Hand'e W'ks), dis 30 %
Cotton (Humason & Beckley Mfg. Co).......... dis 40 %
Belt.......... dis 60&10
Bench—Hotchkiss' $5.00 ℔ doz.......... dis 10 %
Weston's, No. 1, $10.00; No. 2, $9.00 ℔ doz.......... dis 25
McGill's, $3.00 ℔ doz.......... dis 10 %
Clothes Line, Sargent's list.......... dis 65&10 %
Clothes line, Reading list.......... dis 45&5&10 %
Ceiling, Sargent's list.......... dis 60&10&10 %
Harness, Reading list.......... dis 40&10&10 %
Coat and Hat, Sargent's list.......... dis 60&10&10 %
Coat and Hat, Reading.......... dis 40&10&10 %
Wire Coat and Hat, Gem.......... dis 3 &10 %
Wire Coat and Hat, Miles'.......... dis 70 %
Picture Hooks, Brown's Pat. Solid Brass, $4.00 ℔ gross.......... dis 25 %
Tassel and Picture (T. & S. Mfg. Co.).......... dis 50 %
Wrought Staples and Hooks & Staples.. dis 70&7½&10 %
Wrought Staples, Stanley's list.......... dis 70&7½&10 %
Wire Screw Hooks and Eyes.......... new list, dis 70&10
Grass and Bush.......... dis 45@50 %
Whiffletree—Patent.......... dis 40 %
Hooks and Eyes—Malleable Iron.......... dis 60&10 %
Hooks and Eyes—Brass.......... dis 60&10 %

Horse Nails.

Nos.	5	6	7	8	9	10	
Ausable, ℔ ℔	31c	28c	26c	25c	24c	23c	dis 30&10 %
Clinton, Plain, ℔ ℔	23c	21c	20c	19c	18c		dis 30&10 %
Clinton, Fin., ℔ ℔	24c	22c	21c	20c	19c		dis 30&10 %
Essex, ℔ ℔	31c	28c	26c	25c	24c	23c	dis 30&10 %
Putnam "	27c	24c	22c	21c	20c	19c	dis 5&7 %
Vulcan, "	26c	23c	21c	20c	19c	18c	dis 12½ %
Globe, "	24c	21c	19c	18c	17c	16c	dis 12½ %
A. C., "	26c	23c	21c	20c	19c	18c	dis 10&10 %
Ch'mpl'in Forged "	31c	28c	26c	24c	24c	23c	dis 30 %
New Haven, "	31c	28c	26c	25c	24c	23c	dis 30&10 %
Bridgewater, "	24c	21c	19c	18c	17c	16c	dis 25 %

Horse Shoes.
Burden.......... ℔ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy.......... ℔ keg $4.37½
Walker's Forged, Light, Med. or Heavy.. ℔ keg $4.37½
Mule Shoes.......... ℔ keg $5.37½
Dunning's Steel.......... ℔ keg $9.25

Ice Awls, Chisels, &c.
American Ice Chisel.......... ℔ doz $3.00 net
National Ice Chisel.......... ℔ doz $6.25 dis 20 %
Novelty Ice Breakers.......... ℔ doz. $6.25 dis 20 %
White's Sliding Head Picks.......... ℔ doz $2.50 dis 40 %
Dunlap's Ring Picks.......... ℔ doz $1.00 dis 20 %
Wood Head Picks, Sargent's.... ℔ doz $1.60 dis 50&10 %
Iron Head Picks, Sargent's.......... ℔ doz $1.25 dis 50&10 %
Ice Mallets, Pick in head.......... ℔ doz $1.75 dis 15 %
Ice Mallets, Pick in Handle.......... ℔ doz $2.00 dis 15 %
Ice Axes, Small Cast or Malleable.. ℔ doz $1.20 dis 10 %
Combination Ice Tools.......... ℔ doz $2.00 net

Ice Cream Freezers.
Amn. Mch. Co.......... dis 40 %
Torrey's.......... dis 40 %
Packer's.......... dis 40 %

Ice Creepers.
Safety Reversible.......... ℔ gross $25; Arctic Solid.......... ℔ gross $30 — dis 10 %

Ice Tongs.
Champion.......... ℔ doz $6.00 dis 25&10 %
Family.......... ℔ doz $2.75 dis 15 %

Kettles.
Brass, 7 to 13 inches inclusive.......... ℔ ℔ 28c net
Brass larger than 13 inches.......... ℔ ℔ 32c net

Knives.
Ames' Butcher Knives.......... dis 20 %
Ames' Shoe Knives.......... dis 15 %
Ames' Bread Knives.......... ℔ doz $1.40 dis 15 %
Moran's Shoe and Bread Knives.......... dis 40 %
Hay and Straw, Wadsworth's.......... dis 33⅓
Table and Pocket.......... See Cutlery

Knobs.
Carriage (Jap'd 80c ℔ gross).......... dis 60&10 %
Base—Common.......... dis 30&10 %
Hemacite Door Knobs.......... new list, dis 35&5 %
Door Mineral; Door Por. Jap'd; Door Por. Plated; Door Por. .... Same discounts as Door Locks.
Furniture Plain.......... 75c gross inch, dis 10 %
Furniture, Wood Screws.......... dis 20 %
Picture, Judd's.......... dis 60&10&10 %
Picture, Sargent's.......... dis 60&10 %
Hemacite, Picture.......... dis 35 %
Shutter, Porcelain.......... dis 60&10 %

Ladles.
Melting, Sargent's.......... dis 50&10 %
Melting, Reading.......... dis 30&10 %
Melting, Monroe's Patent.......... ℔ doz $4.00 dis 40 %
Melting, P. S. & W.......... dis 30&10 %

Lanterns.
Tubular.......... No. 0, $7.50; No. 1, $8.00; With Guards, 40c extra — net
Nail City.......... No. 1 ℔ doz $10; No. 2, $9, net
Meteor.......... No. 1, ℔ doz, $9.50; No. 2, $8.5, net
Hurricane, No. 2.......... ℔ doz $5.75, net
Peerless, No. 5.......... ℔ doz $11.75, dis 10&10 %
Brady's Patent.......... dis 10&10 %
Ætna.......... dis 10&10 %
Yankee.......... dis 10&20 %
De Beque.......... dis 10&10 %
Police Small, $6.25; Med., $7.50; Large, $10.00, net
Convex Reflector.......... ℔ doz, [illegible]

Lawn Mowers.
Excelsior and Clipper.......... dis 33⅓ %
Pennsylvania.......... dis 30 %
Philadelphia.......... dis 30 %

Lemon Squeezers.
Porcelain Lined.......... ℔ doz $6.00, dis 30 %
Wood.......... ℔ doz 3.00, dis 30 %
Eureka, Tinned.......... doz 8.00, dis 10 %
Dunlap's Improved.......... ℔ doz 5.75, dis 20 %
Sammis'... No. 1, $5; 2, $8.40; 12, $15 ℔ doz; dis 25&10 %
Townsend's Patent.......... $6.00 ℔ doz, dis 33⅓ %
Jennings "Star".......... $3.00 ℔ doz net
The "Boss".......... ℔ doz $4.00, dis 10&10 %
Dean's Nos. 1, ℔ doz, $15.00; 2, $9.00; 3, $5.00. dis 20&10 %

Lines.—Linen Fish.......... dis 25&10 %
Cotton Chalk.......... dis 55 %
Silver Lake, Braided, Nos. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ℔ gross.......... dis 20 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50.......... net
Masons' Colored Cotton.......... dis 45 %
Wire Clothes, Galvanized.......... each 25c@40c net

Locks and Latches.
Cabinet, Eagle; Cabinet, Gaylord; Cabinet, Bridgeport.......... Changes made in list price of some numbers Jan. 1, 1881, dis 25&2 %
Cabinet, P. & F. Corbin.......... dis 25&2 %
Cabinet, A. E. Deitz.......... dis 30 40 %
Cabinet, Stoddard Lock Co.......... dis 40&5 %
Trunk, new list, Jan. 1, 1881.......... dis 15&2 %
Langstroth & Crane's List, Jan. 1, '77:
Round Key, Nos. 1 to 5.......... dis 40&10 %
Round Key, Nos. 5½ to 12.......... dis 40&10 %
Flat Key.......... dis 33⅓&10 %
A. E. Deitz, Flat Key.......... dis 30@40 %
Yale Lock Co., Flat Key.......... dis 40 %
"Shepardson" or "U. S.".......... dis 35 %
"Felter" or "American".......... dis 33⅓ %
Plate.......... dis 33⅓&2 %
F. Many's "Extension Cylinder".......... $10.50 ℔ doz net

DOOR LOCKS, ETC.

Branford; Norwalk; Norwich; P. & F. Corbin; Russell & Erwin; Mallory, Wheeler & Co.; Whipple Mfg. Co. .... Circular Prices: Revised list of June 11, 1883, dis 50 % and 2 % for cash.
Reading Hardware Co. (low list).......... dis 40&2 %
Padlocks—Russell & Erwin; Mallory, Wheeler & Co.; Norwich Lock Mfg. Co.; Wm. Wilcox & Co. .... dis 30&10 % and 2 % for cash
Yale Lock Mfg. Co.'s "Standard".......... dis 40 %
Romer's.......... dis 25 @ 40 %
Conestoga.......... dis 60 %
Scandinavian (Moore Bros.).......... dis 80 %
J. H. McWilliams.......... dis 10 %
A. E. Dietz.......... dis 35 %
"Star".......... dis 45 %

Lustro.—4-oz. bottles, ℔ doz $1.75; ℔ gros $17.00 net

Mallets.—Hickory.......... dis 10&10 %
Lignumvitae.......... dis 10&10 %
Penfield Block Co., Lignumvitae & Hickory.. dis 30 %

Meat Cutters.

Dixon's (P.S.&W.) Nos.	1	2	3	4	
℔ doz.	$14.00	17.00	19.00	30.00	dis 25&5 %

Miles' Challenge.... Nos.	1	2	3	
℔ doz.	$22.00	30.00	40.00	dis 40 %

Perry's Nos.	1	2	3	4	4 g'rd	5 g'rd	
Each	$3.00	4.00	5.00	11.70	13.00	36.00	dis 25&5 %

Woodruff's (P. S. & W.)... Nos.	100	150	
℔ doz.	$15.00	18.00	dis 25&5 %

Hales'..... Nos.	11	12	13	
℔ doz.	$27.00	35.00	45.00	dis 50&10&2 %

Draw Cut.. Nos.	5	2	6	8	10	
Each	$50.00	75.00	80.00	225.00	400.00	dis 20 %

American.......... dis 20&10 %

Nos.	1	2	3	4	B	5
Each	$5.00	7.00	10.00	25.00	50.00	60.00

Kieser's No. 55.......... $40 ℔ doz dis 40 %
Kieser's Gem.......... $25 ℔ doz, dis 40 %
Kieser's Monarch.......... $45 ℔ doz, dis 40 %
Kieser's Butcher.......... $40 each, dis 20 %
Silver & Deming.......... dis 25 %
Pennsylvania.......... dis 40&10 %

Nos.	1	2	3	00
℔ doz	$24.00	28.00	36.00	18.00

Beef Shaver (Enterprise Mfg Co.).......... dis 20&10 %

Mincing Knives.
Am. (2d quality), ℔ gross, 1 blade, $7; 2 blades, $12; 3 blades, $18.......... net
Lothrop's.......... dis 20&10 %
Smith's, ℔ doz, Single, $2.25; Double, $3... dis 33⅓&10 %
Cowles Hdw. Co.......... dis 55 %

Molasses Gates.
Stebbins Patterns.......... dis 70&10 %
Stebbins Genuine.......... dis 67½&10 %
Stebbins Tinned Ends.......... dis 40&10 %
Chase's Hard Metal.......... dis 50&10 %
Bush's.......... dis [illegible]
Lincoln's Pattern.......... dis 60&10 %
Weed's.......... dis 15 %

Boss Nos.	1	2	3	4	
	$7.00	8.00	9.00	10.00	℔ doz. dis 60&10&10 %

Nails........... See Trade Report

Nuts and Washers.—(In lots less than 100 ℔ add ½c to list; 1 lb. boxes, add 1c to list.)
Square Nuts.......... 8 c off list
Hexagon Nuts.......... 8¼c off list
Washers.......... 7½c off list

Nut Crackers.
Table (Humason & Beckley Mfg. Co.).......... dis 33⅓ %
Blake's Pattern.......... ℔ doz $2.00, dis 5 %
Turner & Seymour Mfg. Co.......... dis 50 %

Oakum.—⅛ on 100 bales and over ⅛ % ℔ ℔.
Best.......... ℔ ℔ 9 c
U. S. Navy.......... ℔ ℔ 8 c
Navy.......... ℔ ℔ 6¾c

Oilers.—Zinc and Tin.......... dis 60 %
Brass and Copper.......... dis 50 %
Malleable (Hammer's).......... ℔ doz. $5.00, dis 10 %
Prior's Patent or "Paragon" Zinc.......... dis 60 %
Prior's Patent or "Paragon" Brass.......... dis 50 %
Olmstead's, Tin and Zinc.......... dis 60 %
Olmstead's, Brass and Copper.......... dis 50 %
Broughton's, Zinc.......... dis 60 %
Broughton's, Brass.......... dis 50 %

Packing, Steam.
N. Y. Belting and Packing Co.......... dis 20 %

Pencils.
Faber's Carpenters'.......... high list, dis 50 %
Faber's Round Gilt.......... ℔ gross $5.25, net
Dixon's Lead.......... ℔ gross $4.50, net
Dixon's Lumber.......... ℔ gross $6.75, net
Dixon's Carpenters'.......... dis 40&10 %

Picks.
Railroad, 5 to 6, $11.00; 6 to 7, $12.00.......... dis 45 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00.......... dis 45 %

Picture Nails.
Brass Head, Sargent's list.......... dis 50&10 %
Brass Head, T. & S. Mfg. Co.......... dis 50 %
Porcelain Head, Sargent's list.......... dis 50&10 %
Porcelain Head, Judd's list.......... dis 40@40&10 %
Porcelain Head, T. & S. Mfg. Co.......... dis 40 %
Niles' Patent.......... dis 40 %

Pinking Irons........... ℔ doz 75c, net

Plaiting Machines.
Magic.......... ℔ doz $10.00, net
Astor Plaiting Machine.......... each $15.00, dis 20 %
Crown Plaiting Machines.......... dis 25 %
6 in., $6.00; 10 in., $8.00 each.

Planes and Plane Irons.
Bench, First Quality.......... dis 20 %
Bench, Second Quality.......... dis 25 %
Molding.......... dis 15 %
Bailey's (Stanley R. & L. Co.) new list, Jan. '79. dis 20&10 %
The Stanley (S. R. & L. Co.) new list, Jan. '79.. dis 20&10 %
Bailey's "Victor".......... dis 20&10 %
Defiance Adjustable.......... dis 20&10 %
Laflin Mfg. Co.......... dis 35 %
Plane Irons, Butcher's.......... $5.00 @ $5.25 to £
Plane Irons, Buck Bros.......... $5.00 to £
Plane Irons, Auburn Tool Co.......... dis 20 & 10 %
Plane Irons, The Globe Mfg. Co., "Baldwin Iron".......... dis 20 & 10 %
Plane Iron, Ohio Tool Co.......... dis 20&10 %
Plane Irons, Sandusky Tool Co.......... dis 20&10

Pliers and Nippers.
Button's Patent.......... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $14.50; No. 4, 7 in., $21.00 ℔ doz.......... dis 25 %
Humason & Beckley Mfg. Co.......... dis 30&10 %
Gas Pliers.......... dis 50 %
Eureka Pliers and Nippers.......... dis 40 %
Russell's Parallel.......... dis 25 %
P. S. & W. Cast Steel.......... dis 33⅓&10 %
P. S. & W. Tinners' Cutting Nippers.... add 6 % dis 10 %

Plumbs and Levels.
Disston's.......... dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable.......... dis 65&10 %
Stanley R. & L. Co.'s Non-Adjustable.......... dis 65&10 %
Chapin's Patent Adjustable.......... dis 65&10&10 %
Chapin's Non-Adjustable.......... dis 65&10&10 %
Standard Rule Co.'s New Adjustable.......... dis 65&10 %
Standard Rule Co.'s Non-Adjustable.......... dis 65&10 %
Johnson's Patent Adjustable.......... dis 65&10 %
Pocket Levels.......... dis 65&10 %
Davis' Inclinometers.......... dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger.......... ℔ doz $37.50, dis 20 %
Fletcher Post Hole Augers.......... ℔ doz $30.00, dis 20 %
Vaughan's Post Hole—6 in., $23.00; 7, 8 and 9 in., $25.00 ℔ doz.... dis 20&10 %
Eureka Diggers ℔ doz $27.00.......... net
Leed's each $2.50.......... net

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw, ℔ doz $19.00, dis 20 %
Disston's Pruning Hook.......... ℔ doz $12.50, dis 20 %
E. S. Lee & Co.'s Pruner.......... dis 33⅓ %
Pruning Shears.......... ℔ doz $5.50 @ 6.00
Wheeler, M. & Co.'s Combination.......... ℔ doz $12, dis 20 %
Dunlap's Saw and Chisel.......... ℔ doz $9.00, dis 10 %

Pulleys.
Hot House and Tackle.......... dis 65&10 %
Jap'd Screw.......... dis 65&10 %
Brass Screw.......... dis 70&10 %
Jap'd Side.......... dis 65&10 %
Jap'd Clothes Line.......... dis 60&10 %
Hay Fork, Solid Eye.... $4.50; Swivel, $5.00, dis 50&10 %
Hay Fork, "Anti Friction".......... $6.75, dis 10&10 %
Hay Fork, "F" Common and Pat. Bushed.......... dis 20 %
Hay Fork, Tarbox Pat. Iron.......... dis 30 %
Shade Rack.......... dis 45 %

Punches.
Belt or Drive.......... ℔ doz $2.00; $.85 [illegible] dis 20 %
Bemis & Call Co.'s Cast Steel Drive.......... [illegible]
Bemis & Call Co.'s Springfield Socket.......... [illegible]

Spring.....₩ doz $7.00, dis 50&7½ %
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid, Tinners'.....₩ doz $1.44, dis 40 %

Rail.
R. Sliding, Door, Wrought Brass...₩ lb 43c, dis 90 %
Sliding Door, Bronzed Wrt. Iron...₩ foot 12c. dis 35 %
Sliding Door Iron, Painted.....₩ foot 4c. dis 10&10 %
Barn Door....inch..... ½ ⅝ ¾
Per 100 feet $2.60 3.60 4.60—dis 10 %
B. D. for N. E. Hangers—
Small. Med. Large.
Per 100 feet.....$2.10 2.90 .30—net
Terry's Wrought Iron, 50c ₩ foot, ...net

Razors.
J. R. Torrey Razor Co.....dis 15 %

Razor Strops.
Genuine Emerson.....dis 45 %
Badger's Emerson.....dis
Badger's (not Emerson).....dis 33⅓ %
Imitation Emerson.....₩ doz $2.00, dis 20 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 45 2 %
Saunder's.....dis 10&
Torrey's.....dis 2

Rivets.
Iron and Tinned, new list, Dec. 10, 1881.....dis 40 %
In bulk, new list, Dec. 10, 1881.....dis 40 %
Copper Rivets and Burrs.....dis 50 %

Nos.	7	8	9	10	11	12	13	14	15
₩ lb.	49c	50c	52c	54c	56c	58c	60c	64c	70c

Rivet Sets......dis 33⅓&10 %

Rods.
Stair, Brass.....dis 25 %
Stair, Black Walnut.....60c. ₩ doz. dis 10 %

Rollers.
Barn Door, Sargent's list.....dis 6c&10&10 %
Acme (Anti-Friction).....dis 50 %

Rope.
Mnfs' List, June 19, 1883.....dis 1c ₩ lb
Manila.....½ inch and larger ₩ lb 15½c
Manila.....⅜ inch ₩ lb 16 c
Manila.....¼ and 5-16 inch ₩ lb 16½c
Manila, Tar'd Rope.....₩ lb 15 c
Manila, Tar'd Lath Yarn.....₩ lb 15½c
Manila, Hay Rope.....½ inch and larger ₩ lb 11 c
Sisal.....⅜ inch ₩ lb 12½c
Sisal.....¼ and 5-10 inch ₩ lb 12 c
Sisal, Hay Rope.....₩ lb 11 c

Rules.

	Boxwood.	Ivory.
Chapin's, Standard, Stanley	dis 70&10 %	dis
Stephens	dis 7c&10 %	dis 45%

Sad Irons.
From 4 to 10.....₩ lb 3½c net
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Doubled Pointed.....dis 35 %
Mrs. Pott's Irons, Square Back.....dis 35 %
Enterprise Star Irons, new list, July 20, 1882...dis 35 %
Combined Fluter and Sad Iron....₩ doz $15.00, dis 15 %
Chinese Laundry (N. E. Butt Co.).....85c. dis 15 %
New England.....50 dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1 ..$4.10 ₩ ream
Baeder & Adamson's Flint, 2, 2½ & 3. 5.00 ₩ ream
Baeder & Adamson's Flint, Assorted. 4.75 ₩ ream
Baeder & Adamson's Star.....3.75 ₩ ream
Baeder & Adamson's Emery...₩ ream $6.50 @ 11.50
Bartles Flint.....$4.75&$6.25 ₩ ream dis 35 %
Bartles Harrison, $4.75 ₩ ream.....dis 35 %
New England same list as B. & A. Flint.....dis 35 %
Gage's.....dis 20&5 %

Sash Cord.
Common.....₩ lb 13c net
Patent.....₩ lb 15c net
Silver Lake, Hemp.....₩ lb 50c, dis 10&5 %
Silver Lake, White Cotton.....₩ lb 50c, dis 10&5 %
Silver Lake, Drab Cotton.....₩ lb 55c, dis 10&5 %
Raw Hide, ₩ foot, ¼ in., 5c.; 5-16 in., 7c.; ⅜ in., 10c.
.....dis 15 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00 ₩ gross...dis 15 %
"Common Sense," Japanned, Coppered and Bronzed.....₩ gross $5.00 net
"Common Sense," Nickel Plated..₩ gross $10.00 net
"Universal".....dis 40 %

Sash Weights.
Solid Eyes, in 400 ₩ lots and over.....₩ lb 1¾cnet

Sausage Stuffers or Fillers.
Miles "Challenge".....₩ doz $20, dis 40 %
Perry.....₩ doz, No. 12; No. 0, $21, dis 25&5 %
Draw Cut No. 4.....each $30.00, dis. 20 %
Enterprise Mfg. Co.....dis 20&10 %
Silver's.....dis 25 %

Saws.
Disston's Circular, Mill and Cross Cut.....dis 40 %
Disston's Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning Cross Cuts, new list.....dis 40 %
Boynton's Circular and Mill.....dis 40 %
Boynton's Ice.....dis 25 %
Boynton's Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 30 %
W. M. & C. Mfg. Co. Cross Cuts.....dis 30 %
Livingston's Butcher and Kitchen.....dis 20 %
Livingston's Pistol Wood

Nos	101	102	103	104	105
Per doz.	$10.02	8.40	10.00	7.40	6.20 net

Peace Circular and Mill.....dis 40 %
Peace Hand, Panel and Rip.....dis 25 %
Peace Cross Cuts.....dis 35 %
Peace Band Saws, all widths.....dis 10 %
Richardson's Circular.....dis 40 %
Richardson's Mill and X Cut.....dis 40 %
Richardson's Hand Panel, Butcher and Web Saws.....dis 25 %

Saw Frames.
White, Vermont.....₩ doz $1.50. dis 25&10%
Red, Polished and Varnished.....₩ doz $1.50, dis 10%
Saw Rods.....$10 list, dis10 & 10%

Saw Nuts.
Boynton's Patent X Cut, per doz, $12.00; Hand Saw per doz, $10.00.....dis 25 %
Stillman's Genuine.....₩ doz $3.50 and $4.50 dis 10 %
Stillman's Imitation.....₩ doz $3.25, dis 30&10 %
Common Lever.....₩ doz $2.00, dis 30&10 %
Leach's.....No 0. $3.00; No. 1, $15.00, dis 15 %
Nash's.....dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent.....dis 30&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 50&10 %
Aiken's Imitation.....$7.00, dis 50 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %
Morrill's.....No. 1, $15; No. 0, $12, dis 30&5 %

Scales.
Hatch, Counter, No. 171.....₩ doz $42, dis 45 %
Hatch, Tea, No 161.....₩ doz $15.00, dis 45 %
Union Platform.....$6.00, dis 45 %
Fairbanks'.....dis 20 %
Riehlé Bros.....dis 20 & 10 %
Buffalo Scale Co.....dis 20&5 %
Forsyth Scale Co.....dis 25 %
Howe's.....dis 20&10 %
Chatillon's Grocers'.....dis 40 %
Chatillon's Eureka.....dis 25 %
Family Universal, 12 lb, $30; 24 lb $36.....net
Family Favorite.....dis 30 %
Family, Turnbull's.....dis 30 %
Scale Beams, List of January 12, 1882.....dis 33⅓&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.50, dis 20&10 %
Box 1 Handle.....₩ doz $4.00, dis 10 %
Box 2 Handle.....₩ doz $6.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 45&10 %
Ship, common.....₩ doz $3.50 net
Ship, Providence Tool Co.....dis 10 %

Screen Cutters.
Porter's Pat Windowand Door Frame.....dis 33⅓

Screw Drivers.
Douglas Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros.....dis 25 %
Stanley Rule & Level Co.'s, Varnished Hdls..dis 60&10 %
Stanley Rule & Level Co.'s, Black Handles..dis 40&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet
₩ doz, 4 in., $9.00; 5 in., $10.20; 6 in., $12.00—dis 35 %
Mallett & Co.'s Double Action Clutch
₩ doz, 4 in., $7.00; 5 in., $8.00; 6 in., $9.00—dis 15 %
Champion.....dis 25 %
Clark's Patent.....dis 25 %

Screws.
Flat H'd Iron, new list, Dec 27, 1882.....dis 50&10 %
Round Head Iron, new list, Dec. 27, 1882.....dis 45&10 %
Flat Head Brass, new list, Dec. 27, 1882.....dis 40&10 %
Round Head Brass, new list, Dec. 27, 1882...dis 40&10 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 20&10 %
Coach, Patent Gimlet Point, 65&10 %, by the keg, dis 70 %
Coach, Common or Lag.....dis 60&<&10 %
Bed.....dis 10 %
Machine, Flat Head, Iron.....dis 55 %
Machine, Round Head, Iron.....dis 50 %
Bench, Iron.....dis 55&10 %
Bench, Wood, Beech.....₩ doz $3.00, dis 10 %
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 20&10 %
Hand rail, Sargent's.....dis 60%&10 %
Hand Rail, Humason, Beckley & Co.'s...dis 60%&10 %
Hand Rail, Am. Screw Co., list of Jan. 1, '81.....dis 70 %
Jack (Wilson's).....dis 25 %

Screw Window Balances.
R. B. Hugunin's, No. 1, $2.10; No. 2, $1.75; No. 3 $1.50.....₩ doz net

Scroll Saws.
Lester, $10.00.....dis 25 %
Rogers, $3.50.....dis 25 %

Shears and Scissors.
American (Cast) Iron.....dis 70@70&10 %
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $1.75
Tinners'.....add 5 %, dis 10 %
Seymour's, List, Dec., 1881.....dis 60 %
Heinsch's, List, Dec., 1881.....dis 60 %
Heinsch's Tailor's Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %
Wiss, J., & Sons' list, Dec., 1881.....dis 60 %

Sheaves.
Sliding Door, M. W. & Co. list.....dis 45&2 %
Sliding Door, R. & E. list.....dis 60&10&2 %
Sliding Door, Patent Roller.....dis 60&10&2 %
Sliding Door, Patent Roller, Hatfield's...dis 60&10&2 %
Sliding Door, Russell's Anti-Friction.....dis 60&10&2 %
Sliding Door, Moore's Anti-Friction.....dis 60 %
Sliding Shutter, R. & E. list.....dis 45&10&2 %
Sliding Shutter, Sargent's list.....dis 50&10 %
Sliding Shutter, Reading list.....dis 50&10 %
Lucey's Anti-Friction (Hanging).....dis 60 %

Shovels and Spades.
Ames, New list, July 1, 1881.....dis 15 %
Griffiths.....dis 40 %
Old Colony.....dis 15 %
Payne Pettebone & Son, new list.....dis 40&10 %
Payne Pettebone & Son, R. R. Shovels.....dis 15 %
Remington's (Lowman's Patent).....dis 30 %
Rowland's.....dis 60&<5 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 60&10&2 %
Iron and Brass Head, P. S. & W.....dis 40&<&10 %
Polished Steel, new list.....dis 40&10&2 %

Slates.
Square Frames, by case.....dis 70 %
Less than a case.....dis 64&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.), new list.....dis 30&10 %
Stearns'.....dis 30&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00, dis 40&5 %
Stearns'.....₩ doz $9.00, dis 20&10 %
Ives'.....No. 1, $14.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'.....₩ doz $9.00, dis 15 %

Spoons.
Basting.....dis 60&10 %
Riveted Table and Tea.....dis 50&10 %
Solid Table and Tea.....dis 50&10&5 %
Britannia.....dis 60&10 %
Reed & Barton.....dis 40&10&5 %
Holmes, Booth & Haydens.....dis 40&10&5 %
German Silver.....dis 30&10&5 %
Cast Steel, Silver Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
Tin (P. S. & W.), Tables.....$2.00 ₩ gross, net
Tin (Cowles Hdw. Co.).....dis 10 %
Tin (Cowles Hdw Co.), case lots.....dis 20 %

Stocks and Dies.
"Lightning" Screw Plate.....dis 5&10 %
.....dis 10 %

Stone.
Hindostan No. 1, 6c; Axe, 8c.....dis 40 %
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ lb 6c, dis 33⅓&10 %
Washita Stone.....No. 1, ₩ lb 18c net
Washita Stone.....No. 2, ₩ lb 10c net
Washita Stone, Slips.....No. 1, ₩ lb 37c net
Arkansas Stone No. 1, 4 to 6 in.....₩ lb $1.35 net
Arkansas Stone No. 1, 6 to 9 in.....₩ lb $2.00 net
Turkey Oil Stone (Chase).....4 to 8 in., ₩ lb, 60c, dis 10 %
Turkey Slips (Chase).....$1.75 ₩ lb dis 10 %
Lake Superior (Chase).....₩ lb 16c, dis 10 %
Lake Superior, Slips (Chase).....₩ lb 30c, dis 10 %
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $6.00, dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Lustro.....₩ gross $4.75, net
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $6.75, net
Dixon's Plumbago.....₩ lb 8c. net
Joynton's Noon Day ₩ gross No. 1, large, $4.50 No. 2, small, $3; No. 3, medium, $4.

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases. dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net
Try Square and T Bevels.....dis 50&10 %
Disston's Try Square and T Bevels.....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %

Tacks, Brads, &c.
New List, Sept. 1, 1882.

Tinned Swedes Tacks	dis 30 %
Tinned American Tacks	dis 30 %
Swedes Tacks, all kinds	dis 30 %
American Cut Tacks	dis 30 %
Copper Tacks and Nails	dis 30 %
Swedes Hungarian Nails	dis 35 %
Gimp and Lace Tacks	dis 30 %
Gimp and Lace Tacks, Tinned	dis 30 %
Finishing Nails	dis 25 %
Trunk and Clout Nails	dis 25 %
Common and Patent Brads	dis 2.. %
Basket Nails	dis 20 %
Brush Tacks	dis 20 %
Leathered Carpet Tacks	dis 20 %
Cigar Box Nails	dis 20 %
Chair Nails	dis 20 %
Double-pointed Tacks	dis 40& <5 %

Extra 10 % on all.

Tap Borers.
Common and Ring.....dis 20 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20&10 %

Tapes, Measuring.
American.....dis 20 %
Spring.....dis 25&10 %
Chesterman's.....regular list dis 20&25 %

Thermometers.
Tin Case.....dis 75&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20&10 %
Wood Bottom.....₩ doz $10.00, dis 25&10 %
All Iron.....₩ doz $8.25, dis 25 %
Nashua Lock Co.'s.....₩ doz $18.00 dis 50&25 %
Wilson's.....dis 35 %
Clipper (Sargent & Co.).....₩ doz $12.00, dis 20 & 10 %

Toe Calks.
Winsted.....₩ lb 9c, dis <

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 20 %
Tools (P. S. & W.).....add 5 % dis 10 %

Trammon Lifters.
Wollensak's Patent.....dis 35 %
Reiher's Patent, new list, Feb., 1883.....dis 20&10&10 %
Excelsior.....dis 50&10&2 %

Traps.
Game, Newhouse.....dis 35 %
Game, Oneida Pattern.....dis 60 %
Game, Blake's Patent.....dis 40&5 %
Mouse, Wood, Choker.....₩ doz holes, 15c
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-em-alive.....₩ doz $2.50, dis 15 %
Mouse, "Bonanza".....per gross $10.00 net
Rat, "Decoy".....₩ doz $10.00, dis 10 %

Trowels.
Lothrops' Brick and Plastering.....dis 35 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis <5 %
Clement & Raynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 25 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 55 %

Triers.
Butter and Cheese.....dis 25 %

Trucks (Warehouse, &c.
Penfield Block Co.'s list, 1882.....dis 35 %

Vises.
Solid Box.....dis 35 %
Solid "Crown" (A. H. Hildick).....40 to 100 lb, 15c net
Solid, Peter Wright's.....15&9c
Solid, Wilkinson's.....14@15c
Parallel, Parker's.....dis 10 %
Parallel, Wilson's.....dis 35&10 %
Parallel, Howard's.....dis 20&10 %
Parallel, Merrill's.....dis 15 %
Parallel, Sargent's.....dis 60&10 %
Parallel, Backus and Union.....dis 40 %
Parallel, Oval Slide.....dis 40 %
Parallel, Double Screw Leg.....dis 15&10 %
Parallel, Prentiss.....dis 25 %
Parallel, Simpson's Adjustable.....dis 25&< %
"Family," List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
Saw Filers, Stearn's.....dis 20&10 %
Saw Filers, Hopkins'.....₩ doz $17.50, dis 10 %
Saw Filers, Reading.....dis 40&10 %
Cowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00, dis 25 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ doz Pol. $17.50; Jap'd, $16.50, dis %
Appleton's.....₩ doz $16.00, dis 60&10 %

Washers.—See Nuts and Washers.

Well Wheels......dis 60&10 %

Wire.

Brass and Copper	dis 30 %
Market, Bright and Annealed	dis 55 @ 57½ %
Market, Coppered	dis 50 @ 52½ %
Market, Galvanized	dis 45 @ 47½ %
Market, Tinned, "ined list	dis 47½ @ 50 %
Stone, Bright and Annealed Nos. 0 to 18	dis 57½ @ 60 %
Stone, Bright and Ann aled Nos. 19 to 26	dis 60 @ 62½ %
Stone, Bright and Annealed Nos. 27 to 36	dis 62½ @ 65 %
Stone, Galvanized Nos. 19 to 30	dis 45 @ 47½ %
Stone, Tinned, Tinned list	dis 45 @ 47½ %
Tinned Broom Wire	dis 57½ @ 60 %
Cast Steel Wire	dis 47½ @ 50 %
Annealed Fence, Nos. 8 & 9	dis 57½ @ 60 %
Annealed Grape, Nos. 10 to 14	dis 57½ @ 60 %
Fence Staples	₩ lb 5¾ @ 5¾c
Fence Staples, Galvanized	₩ lb 6¼ @ 6¾c
Stubs Steel Wire	$6.00 to £ dis 30 %
Japanned Barb Fence	₩ lb 6¼c
Galvanized Barb Fence	₩ lb 7¼c
Steel Music Wire, Nos. 7 to 30	$1.00 ₩ lb
Picture Wire, T. S. & J.	dis 40 %
Clothes Line Wire, Galvanized	₩ coil 25 @ 40c net
Wire Cloth, green, drab and black, ₩ sq. ft., 20. @ 25&50	net

Wrenches.

American Adjustable	dis 45 %
Baxter's Adjustable "B," list Jan., 1882	dis 20&5 %
Baxter's Diagonal	dis 20&5 %
Coes' Genuine	dis 50&3 %
Coes "Mechanics"	dis 50&10&3 %
Coes' Pattern, Malleable	dis 75 %
Coes' Pattern Wrought	dis 60 @ 65 %
Girard Standard	dis 60 %
Girard Agl	dis 70 %
Bemis & Call's Patent Combination	dis 20 %
Bemis & Call's Merrick 'n Pattern	dis 35 %
Bemis & Call's Brigg's Pattern	dis 25 %
Bemis & Call's Cy linder or Gas Pipe	dis 30 %
Van Wagoner & Williams' Basin	₩ doz $4.50
Aiken Pocket (Bright)	$6.00, dis 50&10 %
The Favorite Pocket (Bright)	₩ doz $4, dis 40 %
Webster's Patent Combination	dis 25 %
Taylor's Farmers'	dis 25 %

Wringers.

	Per doz.	
Universal, XX, No. 2½	42.00	Less 5 doz., dis 25 %
Universal XX, No. 2	45.00	
Universal, XX, No. 1½	51.00	
Universal, XX, No. 1	96.00	
Peerless, no Cogs, No. 1	42.00	Less 3 doz., dis 25 %
Peerless, with Cogs, No. 2½	45.00	
Peerless, with Cogs, No. 2	48.00	
Peerless, with Cogs, No. 3	54.00	
Peerless, with Cogs, No. 4	66.00	
Eureka, No. 2	42.00	Less 3 doz., dis 25 %
Novelty No. 2, for Common Tubs	$42.00	
Novelty No. 3, for Common Tubs	48.00	
Excelsior No. E, for Stationary Tubs	$41.00	
Excelsior No. F, for Stationary Tubs	47.00	
Excelsior No. A, with Folding Bench	50.00	
Excelsior No. B with Folding Bench	56.00	

ESTABLISHED IN 1859.

THE IRONMONGER AND METAL TRADES ADVERTISER

PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 42a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply specimen copies free.

PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor.

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SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. ***The Week. Legal News. Trade Notes, Bankruptcies, Foreign Notes. Colonial Jottings. Mercantile Circulars, &c.***, are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is $5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful ***Ironmongers' Diary and Text Book,*** a work sold to non-subscribers at 75 cents.

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One-sixteenth page	2.00	2.25	2.50	3.00	3.50	5.00

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This is an annual, **presented free to every Subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER.** It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for next twelve months will be as follows:

JULY 21, AUGUST 18, SEPTEMBER 15, OCTOBER 13, NOVEMBER 10, DECEMBER 8, 1883, JANUARY 5, FEBRUARY 2, MARCH 1 and 29, APRIL 26 and MAY 24, 1884.

This supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach, but in the native language of eighty millions of *German*, twenty eight millions of *Italian*, and fifty-one millions of *Spanish* speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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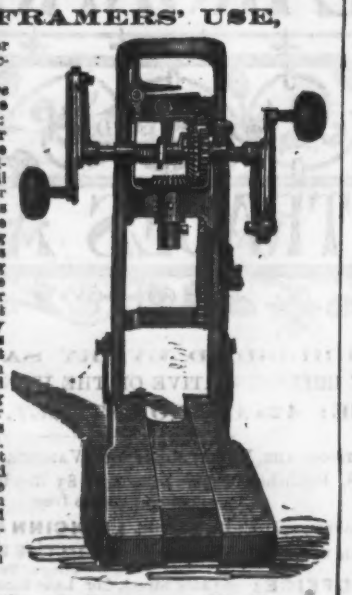
THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of more than twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

SAUNDERS' PATENT
AUTOMATIC BORING MACHINES
FOR BUILDERS' AND FRAMERS' USE,



are universally acknowledged to be superior to all other *Boring Machines*, and we *guarantee* to give better *satisfaction* than any other machine.

Ship Builders, House Builders, Dock Builders, Bridge Builders, Carpenters and *Farmers* please notice what we claim for our machine, and we guarantee all that we claim: First, that it will do nearly double the work of any other machine in the same length of time, with greater ease to the operator; that we can regulate the speed of the bit according to the size of the same, or to suit the operator; it will drive the bit any required speed; it will drive the bit or auger to any required depth, and the bit or auger returns from the hole by the same automatic motion without the operator stopping the machine; at the same time clearing itself and leaving the hole entirely free from chips; it is gauged to bore such a depth as may suit the operator, boring two or more holes at exactly the same depth after being once set, without any attention from the operator; it is an angular machine and will bore on any angle; it is the most compact machine; it can be placed in so small a compass as to occupy but little room in a carpenter's tool chest, and while in this compact form it can be carried in the hand with the greatest ease and convenience; it is the most durable machine, from the fact that we use the best material in its construction, and each part can be duplicated in case of accident by sending directly to us. We finish the ironwork with a baked or heated Japan finish which enables it to withstand all kinds of weather, the woodwork being rubbed in oil and shellaced. They are the cheapest Boring Machines in the world for what they can do. We are introducing the Gladwin Improved Auger in connection with this machine. This auger is the best Boring Machine Auger made, being a self-clearer in gummy or knotty wood. We offer the Borer, boxed and delivered on board cars, for $6. with full set Gladwin Improved Augers, 12 qrs., $9; or with extra finished beds, $6.50, and full set augers, 12 qrs., $9.50. A discount given for large orders. Send for Descriptive Catalogue.

THE W. B. WELLS MFG. CO., Ashaway, R. I.

FOR SALE BY

LOUDERBACK GILBERT & CO., 33 Chambers St., New York.
TALLMAN & McFADDEN, 607 Market street, Philadelphia.
BUHL, SONS & CO., Detroit, Mich.
A. W. BINGHAM & CO., Cleveland, Ohio.
GORDON HARDWARE CO., San Francisco, Cal.
HODGE & HOMER, 47 Randolph treet Chicago, Ill.

HENLEY'S CHALLENGE ROLLER SKATE.

The Latest and Best and Most Complete Scientific

SKATE

IN THE MARKET.

PATENTED
October 16, 1880
AND
August 23, 1881.

LIBERAL TERMS TO THE TRADE.

For Prices, Circulars and further particulars, address, mentioning *The Iron Age*,

M. C. HENLEY, Patentee and Manufacturer,
309 North Fourteenth Street, RICHMOND, IND.

THE SAMSON

is the Best, the Simple and most Portable

WIRE STRETCHER

in the Market.

Line of Draft direct; always Self-Adjusting; Rigid Double Handle; Double Pawl; it works at either end of the fence, at either side of the post and either side up.

LIGHT, PORTABLE, SIMPLE, SURE.

For sale by all leading wholesale Jobbing Hardware Houses and Barb Wire men in the United States.

MANUFACTURED ONLY BY

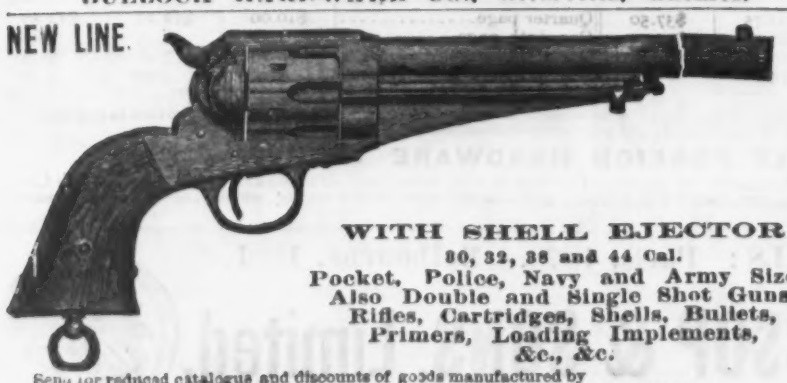
Send for Price List showing our liberal Discounts to the Wholesale Trade.

SAMSON NOVELTY WORKS, Nos. 14 & 16 Main St., De Kalb, Ills.

AND IN CANADA BY

BULLOCK HARDWARE CO., Otterville, Ontario.

NEW LINE.



WITH SHELL EJECTOR

30, 32, 38 and 44 Cal.
Pocket, Police, Navy and Army Sizes.
Also Double and Single Shot Guns,
Rifles, Cartridges, Shells, Bullets,
Primers, Loading Implements,
&c., &c.

Send for reduced catalogue and discounts of goods manufactured by

E. REMINGTON & SONS,
283 Broadway, - - - - NEW YORK.

WROUGHT IRON TACKLE BLOCKS,

Swivel Hooks for Rope or Chain,

POLISHED GROOVES, ALL SIZES IN STOCK.

Also Pulley Blocks for Wire Rope,

Headquarters for the

IRVING BRAND WOODEN PULLEY BLOCKS,

McCOY & SANDERS, Manuf'turers,
26 Warren Street, New York.

GEO. B. CARPENTER & CO

DEALERS IN

SUPPLIES

FOR ROLLING MILLS
MANUFACTORIES
MINING
COMPANIES
& RAILWAYS
WESTERN AGENTS FOR
H.W. JOHNS'
ASBESTOS
LIQUID PAINTS
STEAM PACKING. MILL BOARDS
ROOFING, BOILER COVERING
GASKETS, FIRE PROOF COATINGS
CEMENTS & C.
SEND FOR CIRCULARS
202 & 208 S. WATER ST. CHICAGO.
MENTION THIS PAPER

AGENTS IN ALL FOREIGN COUNTRIES.

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119 South Fourth Street,
PHILADELPHIA
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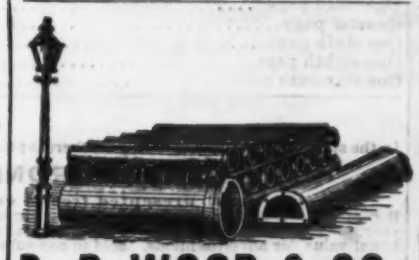
H. HOWSON, Engineer and Solicitor of Patents.
C. HOWSON, Attorney at Law and Counsel in Patent Cases.
SEND FOR CIRCULARS.



R. D. WOOD & CO.,
Philadelphia,
Manufacturers of
Cast Iron Pipe
FOR WATER AND GAS,
Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants.
400 CHESTNUT STREET.

THE LITTLE CIANT

Wagon Tire Upsetter.
The Cheapest and Best.
LITTLE CIANT MFG. CO.,
Send for Circular. Millport, N. Y.

NELLIS, McINTIRE & CO.
PITTSBURG, PA.
Manufacturers Nellis' Electric Spring Agitators, For Cultivators, Harrows, Seeders and Smoothing Harrows.
Nellis' Original Harpoon Horse Hay Fork, Nellis' Grapple and Wood Wheel Pulleys, Nellis' Cast Tool Steel Castings, Nellis' Ornamental Fencings, Railings and Crestings, Agricultural Steels of all kinds. Crucible Cast, Iron Centers, and Open Hearth Steels. Post Augers and Diggers, &c.

Best, Cheapest and Fastest Selling
POTS
On the Market.
Send for discounts.
R. C. PURVIS,
407 CHERRY ST.,
Philadelphia.

MACHINERY FOR
Straightening and Cutting
Of all Sizes to any Length.
Send for Catalogue.
JOHN ADT,
New Haven, Conn., U. S. A.

Prouty's Patent
PEERLESS FORCE PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING PACKING.

It will throw a continuous jet FROM FORTY TO SIXTY FEET. A new pattern jet and spray nozzle is sent with each pump.

Especial attention is called to the material and workmanship exhibited in these pumps.

LIST PRICE, $8.

THE NEW ENGLAND BUTT CO.
PROVIDENCE, R. I.
NEW YORK OFFICE, 99 Chambers St.

THE AMERICAN BOLT AND SCREW CASE CO.,
DAYTON, - - - - OHIO.
MANUFACTURERS OF
REVOLVING BOLT AND SCREW CASES.

We are the only manufacturers of Bolt cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge. All goods guaranteed. Send for Illustrated Circular.

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We are also extensive manufacturers of **Fruit Can Sealing Wax.** Send for Circulars and Prices.

Very Respectfully,

THE AMERICAN BOLT & SCREW CASE CO.

MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,

BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. B. STETSON, Supt. EDWARD S. TABER, Treas.

BEECHER & PECK

Successors to Milo Peck, Manufacturers of

PECKS **DROP** PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

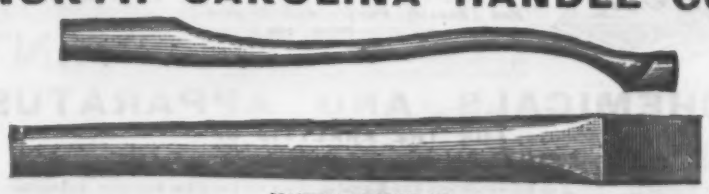
Send for Illustrated Catalogue.

Cor. Lloyd and River Sts. **New Haven, Conn.**

MATTHIESSEN & HEGELER ZINC COMPANY,
LA SALLE, ILLINOIS,
MANUFACTURERS OF
Refined Spelter, Sheet Zinc and Sulphuric Acid.

ALL ORDERS FILLED PROMPTLY.

V. G. HUNDLEY,
PROPRIETOR OF
NORTH CAROLINA HANDLE CO.



MANUFACTURER OF
Handles and Spokes,
70 Reade Street and 97 Chambers Street, - - - - NEW YORK,
HARDWARE COMMISSION MERCHANT.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10½ per cent. per annum.

Anvils.
Peter Wrights, ₩ ℔ ....11 @ 11¼c
Over 200 lbs 11½c
Trenton 10½
Eagle Anvils, American, 100 ....dis 20 %

Apple Parers.
Globe Apple Pearers ....$6 00 net
Penn Apple Parers ....$6.00 net
Lots of 10 to 25 dozen special prices.
Bay State Peach Parer $9 00

Axes.
Hunt's Kentucky and Yankee, per doz ....$8.50 @ 9.00
Robert Mann ....$8.00 @ 8.10
Richland Chief ....$7.50 @ 8.00
Beveled Axes ....add 500 net
Double Bit Axes ....net ....$14.50 @ 15.50

Augers and Auger Bits.—New List January 7, 1880.
Bates' Nut Augers ....dis 45&10 %
Cook's Augers ....dis 40&10 %
Watrous' Ship Augers ....dis 15 %
Benjamin Pierce Auger Bits ....dis 40 %
Griswold Auger Bits ....dis 45&10 %
Cook's " ....dis 40&10 %
Jennings' " ....dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz ....dis 25&10 %
Stearns' Pat. Hol. Augers, list $40 ₩ doz ....dis 20&10 %

Balances.
Light and Common ....dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells ....dis 75 %
Swiss Pattern Hand Bells ....low list dis 40&10 %
Connell's Door Bells ....dis 15 & 10
Gt. Western & Kentucky Cow new list ....dis 60

Boring Machines
Upright, without Augers ....List 5.50 } dis 45@50 %
Angular, without Augers ....6.75 }

Bolts.—Eastern Carriage Bolts ....dis 80 @ 80 & 10 %
Philadelphia " ....new list dis 70&10 %
Stanley, Wrought Shutter ....dis 50&10 %

Braces.—Barber's ....dis 40&5 %
Backus ....dis 50 %
Spofford ....dis 40&5 %
American Ball ....dis 55 %

Butts.—Cast Fast Joint, Narrow ....dis 45&10 %
" " Broad ....dis 45&10 %
Cast Loose Joint, Narrow ....dis 55&10 %
" " Broad ....dis 45&10 %
" Acorn, Loose Pin ....dis 50&10 %
" " Jap'd ....dis 60&10 %
" Mayer's Loose Joint ....dis 60&10 %
Wrought Loose Pin ....dis 55&10 %
" Table Hinges and Back Flaps ....dis 50&10 %
" Narrow, Fast ....dis 50&10 %
" Loose Joint ....dis 55&10 %

Blind Butts.
Parker ....dis 70 & 2 %
Clark ....dis 70 & 2 %
Shepard ....dis 70 %
Lull & Porter ....dis 70&10 %
Buffer's ....dis 50 %

Chains.—German Halter and Coil, list December 31, 1881 ....dis 45@ 50 %
Galvanized Pump ....₩ ℔ 9½c net
Best Proof Coil Chain—English.
₩ ℔ .... 13 10 8½ 7½ 7¼ 7 gold
5-16 ⅜ 5-16 ½ 7-16 ⅝ in.

Chisels.—Socket Framing ....dis 65&10 %
Socket Firmer ....dis 65&10 %
Butcher's ....$5.00 to $ gold

Casters.—Bed (new list July 1, 1880) ....dis 45@50 %
Plate ....dis 45@50 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880 ....dis 45 %
Enterprise ....dis 25 %

Cutlery.—Walden Pocket ....new list net
Penna. Knife Co ....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s ....dis 65&10 %
Adjustable Handle ....dis 20 %

Fry Pans.
Tinned ....dis 45 %
₩ doz. $3.50 4.00 4.50 5.00 5.50 6.50 7.50 9.00 10.00
No. 0 1 2 3 4 5 6 7 8
Burnished ....dis 60, 10 & 5 %
₩ doz. $3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
No. 0 1 2 3 4 5 6 7 8

Files.
Nicholson ....dis 50 %
Disston ....dis 50 %
Butcher ....

Fluting Machines.
Eagle—3½ in. roll ....each, $2.15 } dis 25 %
" —4½ in. roll ....2.85 }
Crown—3½ in. roll ....3.40 }
" —5 in. roll ....4.00 } dis 25 %
" —6 in. roll ....6.40 }
Geneva Fluter ....dis 25 %
Favorite com. Fluter & Sad Iron ....₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list ....dis 30 %
Maydole Hammers ....dis 15 %
Howell A. E. Nail Hammers ....per doz. net $3.75

Handles.
Disston Loop Handles Crosscut ....33c pair net
Boynton Loop Handles Crosscut ....33c pair net

Hatchets.
Yerkes & Plumb, new list ....dis 30 %
Hunt ....dis 25 %

Hinges.
Strap and T ....dis 55 & 10 %

Horse Nails. Nos. 5 6 7 8 9 10
Globe ....24 21 19 18 17 16 dis 12½ %
Vulcan ....20 23 21 20 19 18 dis 12½ %
Ausable ....30 27 25 24 23 22 dis 40&10 %
" Polished and Pt'd & Blued & Pt'd ..31 28 26 25 24 23 dis 30&10 %
Clinton ....23 21 20 19 18 dis 40&10 %
" Polished & Pointed ..24 22 21 20 19 dis 50&10 %

Hay and Straw Knives.
Lightning ....per doz. net $18.00
Electric .... " " 18.00
Wadsworth .... " " 10.50
Walton Straw Knives .... " " 17.00

Locks and Knobs.
Branford ....new list dis 45, 10 & 2 % cash
Gaylord Cabinet ....dis 25&2 % cash
American Padlocks ....dis 30, 10&2 % cash
Scandinavian Padlocks ....dis 50 %
₩ doz. .$5.00 5.50 6.50 7.50 8.50 10.00 12.50 } dis 60 %
No. .... 57 58 59 60 61 62 63 }
₩ doz. ....$18.00 26.00 33.00 } dis 60 %
No. .... 64 65 66 }

Lanterns.
Buckeye ....Large list net; small list net
Tubular ....No. 0, $8.65; No. 1, $10.15 ₩ doz net
Guards, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania ....} new list
Philadelphia ....} dis 30 %
Excelsior ....}

Lawn and Garden Pumps.
Holland Patent ....List $5.00 dis 10 %

Mattocks.
Long and Short Cutter ....new list ....45 %
Pennsylvania Pattern ....dis 4 %

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets ....dis 25 %
Stebbins' Gates ....dis 70&10 %
Lincoln's " ....dis 60&10 %
Landers, Frary & Clark's Petroleum ....dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880 ....dis 45 %
Cork Lined " ....dis 70 %

Meat Cutters.
Dixon's ....dis 25&5 %
Woodruff ....dis 25&5 %
Stowe ....dis 25&5 %
Hale's ....new list, dis 50, 10&2 cash
American ....dis 25 %
Stuffers ....dis 25&5 %
Enterprise Stuffers ....dis 25 %

Planes.—Sandusky Tool Co ....dis 20 %
Ogonts ....dis 25 %
Ohio & Auburn ....dis 20 %
Bailey (S. R. & L. Co.) ....dis 20&10 %

Plane Irons.—Ohio Tool Co ....dis. 20 %
Butcher's $5.00

Plumbs and Levels.
Stanley's Adjustable ....dis 65&10 %
" Non-Adjustable ....dis 65&10 %

Picks.—New list ....40 %

Razor Strops.
Lamont Combination ....per doz. $4.00
" " ....1 gross lots $42.00
Imitation Emerson ....per doz. 2.00

Rules.—Stanley Boxwood ....dis 70 &10 %
Stanley Ivory ....dis 55&10 %

Steelyards.—Hart's Pattern ....dis 33⅓&10 %
₩ doz. $14.50 17.75 21 00 26.50 31 00 35.50
Lbs 50 100 150 200 250 300
American Pattern ....dis 33⅓&10 %
₩ doz. $8.00 10.25 13.75 14.50 16.75 19.50
Lbs 50 100 140 200 250 300

Squares.
Steel and Iron ....dis 50; full case, dis 50&10&2 for cash
Try Squares, Stanley ....dis 50&10 %
Disston's Try Squares ....dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ....₩ doz $9.00 }
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ....₩ doz $8.50 } 30
Clipper No. 5, Painted Red, Boxed and Sharpened ....₩ doz $8.00 }

Saws.—Disston's Hand, Panel and Rip ....dis 20 %
Disston's Circular ....dis 40 %
Cross-Cut No. 2, Plain Tooth ....dis 40%
" Patent Tooth ....dis 40%
" Champion Tooth ....dis 40%
Boynton's Lightning Cross Cut, new list ....dis 40 %
" Lightning Buck Saws, cross bar ....dis 40 %

Shovels and Spades.
Oliver Ames & Sons, new list ....dis 15 %
Griffiths ....dis 50@50&5
Rowland ....dis 50@50&5

Sad Irons.—4 to 10 lbs ....₩ ℔ 3½c
Mrs. Potts' Patent ....dis 35 %

Stone.
Washita Extra ....₩ ℔ 28c net
" No. 1 .... " 18c
" No. 2 .... " 16c
" Slips .... " 37c
" Axe .... " 13c net
Hindostan Oil Stone No. 1 ....₩ ℔ 6c }
" Axe Stone .... " 8c } dis 33⅓ %
" Slips .... " 10c }

Screws.
Flat Head Iron, new list Dec. 27 ....dis 50 & 10%
Flat Head Brass, new list Dec. 27 ....dis 50 & %
Round Head Brass, new list Dec. 27 ....dis. 40 & 10 %
Round Head Iron, new list Dec. 27 ....dis. 45 & 10 %

Spoons.
Plated ....dis 40, 10 & 5 %
German Silver ....dis 30 & 10 %
Britannia, Boardman's ....dis 60 %
" Parker's ....dis 60&10 %
Tinned ....dis 10 %

Springs.—Torrey ....dis 50 %
Gem No. 3 small Jap'd ....$3.00 } dis 50 & 10 %
" No. 2 medium Jap'd ....2.75 }
Coil No. 0, per gross net $6.00
Other Standard Springs ....dis 40&10 %
Warner Door Springs, per doz. net 1.75
Standard Spring Hinges—
Single No. 0, per doz. net 1.25
" No. 1 " " 1.50
Other Standard Spring Hinges ....dis 25&10 %

Stocks and Dies ....dis 10&5 %

Stove Polish.—Gem ....₩ gross, $4.50, dis 5 %
Dixon ....6.00, dis 10%
Fire Fly ....$3.00 gross net

Tacks ....dis 50&10 %
Shoe Nails—4-8, and over 8c ....} 10 %
" " 3½-8, and under 90 ....}
Double Pointed Tacks ....dis 40&5 %

Traps.
Genuine Oneida—Newhouse ....dis 35 %
Im. Oneida—Newhouse list, first qual. dis 25&5 @ 60 %

Vises.—Solid Box, Trenton new list ....dis 35 %

Wrenches.—Agricultural ....dis 70 %
Coes' Genuine ....dis. 50&3 %
Coes' Mechanics' ....dis. 50&10&3 %
" " Mall. Bar ....dis 75 %

Wire.
Bright or Ann'd, No. 0 to 18 ....dis 52½ to 55 %
" " No. 19 to 26 ....dis 60 to 62½ %
" " No. 27 to 36 ....dis 65 to 67½ %
Coppered, 0 to 18 ....dis 47½ to 50 %
Tinned Broom Wire ....dis 55 to 57½ %
Galvanized Barb Wire 9c
Painted Barb Wire 8c
Galvanized No. 7 to 18 ....Market List, dis 42½ to 45 %

Wringers.
Peerless No. 2½ $42.00
" No. 2 ....45 00
Universal No. 2½ 42.00
" No. 2 ....45.00
Novelty No. 2, for common tubs 42 00
" No. 3 " " 48.00
Excelsior E, for stationary tubs 51.00
" F " " 57.00
In lots of 1 doz. $3.00 doz. dis. from above price.

PITTSBURGH.

Merchant Iron.

Terms.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
1½ to 4 by ¼ to 1 inch 2.40
4½ to 6 by ⅜ to 1 " 2.60
1⅜ to 6 by 1⅛ to 1¼ " 2.90
1⅛ and 1¼ by ⅜ to ¾ " 2.60
1 and 1⅛ by ⅜ to ¾ " 2.70
⅝, ¾ and ⅞ by ⅜ to ¾ inch 3.08

Rounds and Squares.
1 to 1⅛ ....2.50 | ⅜ to 9-16 ....2.70
2 to 2⅞ ....2.70 | ⅜ to 7-16 ....2.90
2⅛ to 3¼ ....3.00 | ⅝ 3.10
3⅜ to 4 ....3.30 | 5-16 ....3.30
4½ to 5 ....4.00 | ¼ 3.40
⅞ to ⅛ ....2.60 | 3-16 ....5.50

Oval Iron.
⅞ to 1⅛ ....2.90 | ⅝ 3.30
⅝ to ¾ ....3.10 | ½ 3.70

Half Oval and Half Round.
⅝ to 1¼ inch ....3.20 | ⅜ inch 4.00
⅜ to ⅞ ....3.70 | ¼ " 5.50

Horse Shoe.
⅜ to 1⅛ by 5-16 to ⅝ inch 3.40

Wagon Box Iron.
¾ inch, Nos. 13 and 14 ....3.70
⅞ " " 11 and 12 ....3.50
1 " " 13 and 14 ....4.00
1 " " 11 and 12 ....3.80
1⅛ " " 13 and 14 ....4.40
1⅛ " " 11 and 12 ....4.10

Heavy Bands.
3½ to 6 by ⅛ and 5-16 inch 2.70
1⅞ to 3¼ by ¼ and 5-16 " 2.70
1 to 1⅝ by ¼ and 5-16 " 2.80
¾ to ⅞ by ¼ and 5-16 " 3.00
⅝ and ¾ by ¼ and 5-16 ....3.50

Light Bands.
1⅝ to 6 by ⅛ to 3-16 ....3.00
1⅝ to 6 by Nos. 11 and 12 ....3.10
1 to 1½ by ⅛ to 3-16 ....3.10
1 to 1½ by Nos. 11 and 12 ....3.30
⅞ and 13-16 by ⅛ to 3-16 ....3.40
⅞ and 13-16 by Nos. 11 and 12 ....3.50
¾ and 11-16 by ⅛ to 3-16 ....3.70
¾ and 11-16 by Nos. 11 and 12 ....3.80
⅝ and 9-16 by ⅛ to 3-16 ....
⅝ and 9-16 by Nos. 11 and 12 ....4.10
½ inch by ⅛ and 3-16 ....4.30
½ inch by Nos. 11 and 12 ....4.40

Hoop Iron.
1⅝ to 4, Nos. 13, 14 and 15 ....3.30
1⅛ to 2, Nos. 16, 17 and 18 ....3.40
1⅛ to 2, No. 19 ....3.50
1⅛ to 2, No. 20 ....3.60
1⅛ to 2, No. 21 ....3.70
1⅛ to 2, No. 22 ....3.80
15-16, 1, and 1⅛, Nos. 13, 14 and 15 ....3.40
15-16, 1, and 1⅛, Nos. 16, 17 and 18 ....3.60
15-16, 1, and 1⅛, Nos. 19 and 20 ....3.70
15-16, 1, and 1⅛, No. 21 ....3.80
15-16, 1, and 1⅛, No. 22 ....3.90
⅞, Nos. 13, 14 and 15 ....3.70
⅞, Nos. 16, 17 and 18 ....3.80
⅞, Nos. 19 and 20 ....3.90
⅞, No. 21 ....4.00
⅞, No. 22 ....4.10
13-16, Nos. 13, 14 and 15 ....3.90
13-16, Nos. 16, 17 and 18 ....4.00
13-16, Nos. 19 and 20 ....4.10
13-16, No. 21 ....4.20
13-16, No. 22 ....4.30
¾, Nos. 13, 14 and 15 ....4.10
¾, Nos. 16, 17 and 18 ....4.20
¾, Nos. 19 and 20 ....4.30
¾, No. 21 ....4.40
¾, No. 22 ....4.50
11-16, Nos. 13, 14 and 15 ....4.30
11-16, Nos. 16, 17 and 18 ....4.40
11-16, Nos. 19 and 20 ....4.40
11-16, No. 21 ....4.50
11-16, No. 22 ....4.50
⅝, Nos. 13, 14 and 15 ....4.40
⅝, Nos. 16, 17 and 18 ....4.50
⅝, Nos. 19 and 20 ....4.60
⅝, No. 21 ....4.70
⅝, No. 22 ....4.80
⅝, No. 23 ....4.90
9-16, Nos. 13, 14 and 15 ....4.60
9-16, Nos. 16, 17 and 18 ....4.70
9-16, Nos. 19 and 20 ....4.80
9-16, No. 21 ....4.90
9-16, No. 22 ....5.00
9-16, No. 23 ....5.10
½ inch, Nos. 13, 14 and 15 ....4.80
½ " Nos. 16, 17 and 18 ....4.90
½ " Nos. 19 and 20 ....5.10
½ " No. 21 ....5.20
½ " No. 22 ....5.30
½ " No. 23 ....5.40

The prices under Hoop Iron do not apply to Cotton Ties.

1-100 per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-100 per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1⅛ to 2 in., cut to length.
9 to 11 lbs, per set of 6 hoops 3.30
8 lbs. and less than 9 lbs. per set of 6 hoops 3.60
Less than lbs. per set of 6 hoops 3.80

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire 1.10c

Tank Iron.
No. 9 and heavier 3.30
Plow Slabs 3.50
" Wings 3.80

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.50	5.00	6.50
No. 15 to 17	3.80	5.30	6.80
No. 18 to 21	4.10	5.60	7.10
No. 22 to 24	4.30	5.80	7.30
No. 25 & 26	4.50	6.00	7.50
No. 27	4.70	6.20	7.70
No. 28	5.10	6.60	8.10

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.
1st quality (A) ....10½c | 2d quality (B) ....9 c

Galvanized C. H. B.—(Charcoal Hammered Blooms.
Nos. 14 to 20 ....12c | No. 27 ....15c
Nos. 21 to 24 ....13c | No. 28 ....16c
Nos. 25 and 26 ....14c | No. 29 ....18c
42½ @ 45 % discount.

Coal Screen Iron.
1⅛ by ⅝ by 5-16 ....3.00 | 1 by ⅝ by 5-16 ....3.50

Angle Iron.
2½, 3, 3½ and inch 3.30
1¼, 1½, 2 and 2¼ inch 3.30
1⅛ inch 3.40
1 " 3.60
1⅝ by 1 in. 3, for Plow Handles 3.80
1½ by ⅞ " 3.80
1⅜ by ⅞ " 3.90

T Rail.
8 lbs. to the yard ....2.9c | 20 lbs. to the yard 2.8c
12 " " ....2.8c | 28 ....2.8c
16 " " ....2.8c | 30 ....2.8c

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. Rail, 50c each: 40 lb., 60c each.
3½ by ⅜ and ½ Spikes for 20 and 28-lb. Rail 4½c
2½ and 3 by ⅜ " " 12 and 16-lb. " 4½c
2½ by 5 16 " " 8-lb. Rail 5½c

Flat Rails.—Punched and Countersunk.
1⅛ to 2 by ½ to ⅝ inch 3.00
1⅛ by ⅜ and 7-16 inch 3.20
1⅛ by ⅝, 7-16 and ⅜ inch 3.40

Juniata Nail Rods 6.50
Norway " 8.00
Guard Iron, ⅝x⅜x⅜ and ⅞x⅜x⅜ 4.00
" ⅝x⅝x9 16 and ⅞x⅜x⅛ 4.20
Drag Bars 3.40
Dropper Bars 3.80
Cylinder and Landside Iron 3.80
Plow Beam Iron 3.00

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.
¼ to 2 inches, inclusive 11c
1-16 and 2⅛ to 3 inches 12c
¼ and 3⅛ to 4 " 13c
7-32 and 4⅛ to 5 " 14c
3-16 and 5⅛ to 6 " 17c
5-32 inch 22c
⅛ inch 30c
Oil Well Steel Forgings 20c

Machinery Steel.

	Crucible.	Bessemer & Open Hearth
Ordinary Sizes, ⅜ to 2 inch Round	7c	5c
5-16 and 2⅛ to 3 inches	8c	6c
¼ and 3⅛ to 6 "	9c	7c
7-32 inch	10c	8c
3-16 "	12c	10c

Square, Flat and Octagon, ½c extra throughout the list.

Cut to specified lengths, ½c extra.

Hammer Cast Steel.
Crucible Cast Steel 8½c
Open Hearth Cast Steel 7c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	12c	11c	9c	7c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.
Auger and Auger Bit 8½c
Axle Steel for carriages and wagons 8½c
Frog Points and Plates 10c
" Side Bars 8½c
Pick, plain (hammered) 10c
" and Mattock, beveled (rolled) 8½c
Skate Steel 09
Table Cutlery, plain 7c
Table Cutlery, beveled 7½c
Pike and Cant Hook 8½c
Coal and Granite Wedge 8½c
Roller 8½c
Spindle, subject to Machinery classification 8½c
Trap Spring Steel 10c
Forged Crank Pins and Lathe Spindles 11c
Piston Rods, plain 8½c
" forged to shapes 11c
Slide Bars, plain 8½c
" forged to shapes 11c

Crucible, Open Hearth or Bessemer
Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick 6½c
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick 7½c
Circulars and semi-circulars, when ordered separately 8c
Smoke Stack, to shape 8c
Locomotive Tank Steel 7c

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8-inch and over 8c
Mill Saw, 8-inch and over 8½c
Taper, 3½-inch and over 6½c
Horse and Shoe Rasp 6½c

Spring Cast Steel.
Spiral and Taper, cut to lengths 6½c

Tire Cast Steel.
1x½ and over 8½c
1x3-16, ⅞x3-16 and ⅛ 9c
1 and 11-16x¼ and 5-32, ⅝x3-16 and 5-32 ....9½c
⅝ and ⅝x⅛ and 3-32 and 12 g 1.0c
Solid Safe Cast Steel 7½c
Three and Five Ply Cast Steel 10c

Agricultural Implement Cast Steel.
Fork and Rake, Crucible 8c
Horse Rake Steel, cut to lengths, Crucible 8c
Hoe, Crucible 7½c
Corn Stalk Cutter, beveled 9½c
Beveled Hoe and Shovel Steel in Bars 8½c
Crucible Plow Steel in slabs 6½c

Bessemer and Open Hearth.
Spring 4½c
" spiral and taper, cut to lengths 5½c
Tire, 3-16 thick and above 4½c
Toe Calk 4½c
Plow 4½c
Axle Billets 4½c
Sleigh Shoe 4c
Cutter Shoe, cut to lengths and tapered 4c
Scythe Back Steel 5½c
Grain Drill Bars 4c
" Points 7½c
Rolling Coulter Blanks, cut and punched 8½c
Thrasher Steel 6½c
" Teeth 4½c
Rolled Hammer Billets 5½c
Terms.—Four months; 2 per cent. discount for cash if remitted within 10 days.

Rolls and Castings.
Furnace Floor and Straightening Plates ....3 c
Housings and Castings not otherwise specified ....3 c
Guide Plates 3½c
Spindles and coupling boxes ....3 c
Sand Rolls and Pinions, large size ....3 c
" small size 3½c
Pipe Mill Castings ....5 c
Rolling Mill Castings under 50 lbs ....4 c
Spur and Bevel Wheels, large ....4 c
" " small ....4 c
Pulleys up to 30 inches 4½c
" over 30 inches 4½c
Engine Castings, light ....4 c
" " heavy 4½c
" ....4 c

Chilled Rolls.
6 to in. diam., to 30 in. long 8c
8 to 15 in. " 8 to 40 in. " 4½c
15 to 24 in. " 15 to 72 in. " 4½c
24 to 32 in. 72 to 108 in. " 4½c
After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

White and Red Lead.
Strictly Pure White Lead in Oil, in kegs, 6½c.; in 25 ℔ Tin Pails, ½c. ₩ ℔ over keg price; 12½ ℔ Tin Pails, 1c ₩ ℔ over keg price; assorted, 1 to 5 ℔ cans, 2c. per ℔ over keg price.
Dry White Lead in barrels 6½c
Red Lead, very brilliant, in kegs, 6½c; in barrels 6½c
Litharge (Potter's Lead) " 6½c; 6½c
Freights equalized with all points where White Lead is made.
Terms: Note at sixty days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.

Discount, 70 % on Single Strength, 70 & 10 % on Doub's.

Size.	AA.	A.	B.	C.
Single Strength.				
6 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 15 x 24	9.25	8.50	8.00	7.25
18 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.00
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 28 x 44	14.40	13.25	10.75	9.50
16 x 46 to 30 x 40	15.00	14.00	11.25	10.50
30 x 42 to 30 x 54	16.00	14.50	12.00	
30 x 56 to 34 x 46	17.25	15.50	13.50	
34 x 48 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 15 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 28 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.40	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 50 to 34 x 56	27.75	24.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hubbard, Bakewell & Co.'s Goods.
Axes, Single Bit, Lippincott ....Per doz. $8.00
" " James & Co .... " 7.00
" Double Bit, Lippincott .... " 15.00
" " James & Co .... " 12.00
Drain Tools, list ....dis 20%
Hoes, Planters' ....dis 55%
" Scovill Pattern ....dis 55%
" Handled, Square Eye, German ....dis 25%
Handles, Cross Cut ....Per doz. $3.50
" Shovel, Bent, Bored, Riveted .... " 2.40
Saws, Circular ....dis 45%
" Long ....dis 40%
" Cross Cut, H. B. & Co., Champion, Per ft. net $0.35
" Cross Cut, Lippincott, Champion, Per ft. net 30
Shovels, list ....dis 20%
Spades, " ....dis 20%
Scoops, " ....dis 20%

BOSTON.

Reported by Macomber, Bigelow & Dowse.

Anvil & Vise.—
No. 1, $5.25; 2, 4.25; 3, 3.50 each.....dis 25 %
Augurs & Bitts.—Snell's Auger.....dis 40&10 %
L'Hommedieu's Ship Auger.....dis 15 %
Jenning's Bitts.....dis 10&10&10 %
Cook's Bitts.....dis 40&10 %
Shepardson's Double-Cut Bitts.....dis 45 %
Shepardson's Double Gimlets.....dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₱ doz., $48.00; No. 3, ₱ doz., $60.00 list..dis 20 %
Bonney's Extension Hollow Augers.....₱ doz $30.00
Pierce's Bitts.....dis 50 %
Griswold Bitts.....dis 60 %
Axes.—Blue Jackets.....₱ doz $9.00
Red Cross.....₱ doz 8.00
Red Cross Handled.....₱ doz 12.00
Dowse Handled Boys'.....dis 33⅓ %
Ax Handles.—
Oak Extra, 32 in., No. A.....₱ doz $2.50
Oak Extra, 34 in., No. A.....₱ doz 2.50
Oak Extra, 32 in., No. B.....₱ doz 2.00
Oak Extra, 34 in., No. B.....₱ doz 2.00
Oak Extra, 32 or 34 in., No. C.....₱ doz 1.40
Axle Clips......dis 50 %
Balances.—Chatillon's.....dis 33⅓ %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers).....₱ ft. 20
Cast Half Round.....₱ ft., ⅝, 30; ¾, 40
Wrought Round.....₱ ft., ⅝, 30; ¾, 40; ⅞, 50
Bells.—Connel's Crank Gong, reduced list..dis 15&10 %
Bird Cages.—
Japanned M. B & D., reduced list, 1879.....dis 40 %
Brass M. B. & D., reduced list 1879.....dis 33⅓ %
Blind Fasts.—Lock Fasts.....₱ C sets $6.00
No. 6 Fasts.....₱ C sets 6.00
Veazie Fasts.....₱ C sets 6.00
Shedd's.....₱ C sets 7.00
Blind Hinges.—Mall, Hook, 3 holes.....₱ C sets 7.00
Brad Awl Handles.—
Phœnix Adjustable.....₱ doz $2.00
Belts.—Norway Iron Carriage.....dis 75 %
Common Iron Carriage.....dis 80 & 10 %
Borax.—Refined.....₱ lb 15c
Boring Machines.—
Eagle Upright each.....$4.50 list } dis 40&10 %
Eagle Angle each.....6.75 list }
Snell Augers.....₱ set $2.45
Braces.—Barber's.....dis 40&5 %
Spofford's.....dis 10&5 %
Backus'.....dis 50&5 %
Bracket Saws.—Holly Scroll Saw.....each $2.25
Dermas Lathe and Scroll Saw.....each 6.50
Bracket Saws, extra quality, to No. 5.....₱ gro 0.75
Steel Frame, with patterns.....₱ doz 6.50
Lester.....dis 20 %
New Rogers, all iron.....dis 25 %
Bracket Saw Blades.—Griffith's pat.....₱ gross 75c
Brackets.—
B. B. & M. Flower Pot, reduced list.....dis 14&10 %
Bronzed Shelf, M. B. & D., new list.....dis 50 %
Store Shelf.....dis 20 %
Butts.—Union Fast Joint.....dis 10&10 %
Union Loose Joint.....dis 10&10 %
Union Japanned Acorn.....dis 55&10 %
Union Silvered Acorn.....dis 55&10 %
Union Boston Finish.....dis 70&10 %
Union Spiral Spring.....dis 25&10 %
Wrought Brass.....dis 65& 10%
Carriage Bolts.—Eagle Norway.....dis 70&10 %
Common.....dis 80 & 5 %
Carriage Jacks.—Climax No. 1.....₱ doz $2.00
Climax No. 1½.....₱ doz 15.00
Climax No 2.....₱ doz 13.50
Universal.....dis 25 %
Universal No. 1.....each, $2.00
Universal No. 2.....each 3.00
Universal No. 3.....each 5.00
Universal No. 4.....each 6.00
Universal No. 4½.....each 6.00
Cartridges.—U. S. Cartridge Co.....dis 75 %
Cards.—
Watson's make Horse & Curry.....dis 10 % } New List,
Watson's Cotton.....dis 10 % } July, 1881.
Watson's Wool.....dis 10 % }
Casters.—Bed and Table.....dis 50 %
Chain.—Traces 6½, 10, 4, straight.....₱ pair 100
Traces 6½, 10, 4, twisted.....₱ pair 150
Traces 7, 12, 2, twisted.....₱ pair 80c
Coil 3-16.....₱ lb 10½c
Coil ¼.....₱ lb 8½c
Coil 5-16.....₱ lb 7c
Coil ⅜.....₱ lb 6½c
Coil 7-16.....₱ lb 6c
Coil ½.....₱ lb 5½c
Chalk.—White, Carpenter's.....₱ gross 60c
Red, Carpenter's.....₱ gross 80c
Blue, Carpenter's.....₱ gross $1.00
Chisels.—Hart, Bilven & Wood, Framing..dis 60&10&10%
Underhill, Framing.....dis 25 %
Buck's Chisels.....dis 40 %
Clothes Line.—
Galvanized Wire, 100 feet each.....₱ doz $4.00
Coal Hods.—"Dover."—Galvanized, New List.dis 60%
Japanned, new list.....dis 60 %
Coffee Mills.—New List.....dis 45 %
Copper Rivets......dis 40 %
Cow Ties......dis 33⅓ %
No. 50, 3 ft. No. 6 Wire, with toggle.....₱ doz $3.80
No. 35, 3 ft. No. 6 Wire, with snap.....₱ doz 4.00
No. 40, 3½ feet No. 6 Wire, with toggle.....₱ doz 4.30
No. 45, 3½ ft. No. 6 Wire, with snap.....₱ doz 4.40
No. 50, 4 ft. No. 4 Wire, with toggle.....₱ doz 4.75
No. 55, 4 ft. No. 4 Wire, with snap.....₱ doz 5.00
No. 60, 4½ ft. No. 3 Wire, with toggle.....₱ doz 5.60
No. 65, 4½ ft. No. 3 Wire, with snap.....₱ doz 5.80
Cocks.—Brass. L. F. & Co.....dis 40&10 %
Cordage.—Manila, usual trade dis 10.....₱ lb 15½c
Jute.....₱ lb 9c
Crow Bars.—Cast Steel.....₱ lb 7½c
Iron Steel-pointed.....₱ lb 6c
Cutlery.—Pocket American Shear Co.'s.....dis 40 %
Butcher Knives, Wood's, Lap Bolster, Square Handle.....dis 30 %
Steak Knives.....dis 25 %
Lap Bolster, Oval Handle.....dis 20 %
Sticking.....dis 20 %
Skinning.....dis 30 %
Butcher, Common Round Handle, Wood's.....dis 20 %
Shoe Knives, Wood's.....dis 20 %
Dividers.—Cook's.....dis 25 %
Dog Collars......dis 20 %
Door Springs.—Torrey's Rod.....₱ doz $1.60
Imitation Torrey's Rod.....₱ doz 1.40
Gem Coil, new list.....dis 40 & 10 %
Crown.....₱ doz 1.20
Warner's.....₱ doz 2.00
Door Stops.—Thurston's.....dis 50 %
Drawer Knobs.—Thurston's.....dis 50 %
Drills.—Morse Bitt Stock.....dis 25 %
Morse Straight Shank.....dis 20 %
Emery.—Wellington Mills.....₱ lb 10c
Walpole Emery Mills.....₱ lb 6c
Turkish in 10 lb cans.....₱ lb 8c
Enameled Ware.—
Standard Mfg. Co. Kettles.....dis 40 & 10 %
Standard Sauce Pans.....dis 30 %
Felloe Plates.—Wrought.....₱ lb
Files.—American File Co.....dis 50 %
Nicholson File Co.....dis 5 %
Fluting Machines.—Knox list, $4.00.....dis 20 %
American list, $3.40.....dis 20 %
Forks.—W. C. & Co. Manure.....dis 50 %
Gimlet Bits.—
Genuine German, No. 125, 1-32 to 8-32, per doz $1.00
Pierce's.....per doz .88
Glass Cutters.—Combination Glass Cutter and Knife Sharpener.....₱ doz $1.00
Grab Hoes.—K. P. & Co.'s No. 2, $11.50 ₱ doz..dis 50 %
Hammers.—Maydole's.....dis 15 %
Hartford Hammer Co.....dis 20 %
Hangers & Rollers.—Anti-Friction.....dis 50 %
Acme Rollers.....dis 50 %
Climax.....dis 50 %
Common Hangers.....dis 50 %
Common Rollers.....dis 50 %
Hand Screws......dis 10 %
Hatchets.—C. F. Dowse new list.....dis 33⅓ %
Underhill.....dis 30 %
Hay Knives.—Lightning.....₱ doz. $18.00, net
Fisher's Patent.....₱ doz $14.00
Hinges.—Strap and T (new list).....dis 60 %
Providence Plate.....₱ lb 5 %
Wrought Screw Hook.....₱ lb 5 %
Hoes.—W. C. & Co.'s.....dis 60
Hooks and Staples.—Brewers' (new list).....dis 60
Horse Nails...... No. 6 7 8 9
National Finished.....25 .21 .20 .19.....dis 20 %
Putnam Pointed.....24 .22 .21 .20.....5 %
Bridgewater.....21 .19 .18 .17.....list
Ice Cream Freezers.—Packer's, new list.....dis 50 %
Knobs.—"Norwalk." New list.....dis 45 %
Silver Glass.....dis 50&10 %
Silver Glass Bell Pulls.....dis 50&10 %
Lanterns.—Tubulars, No. 0.....₱ doz 8.00
Railroad, Oil, No. 43.....₱ doz 9.00
Triangular.....₱ doz 4.00
Lawn Mowers.—The "Daisy."
12 in. cut.....each, $8.00
14 in. cut.....each 8.50
16 in. cut.....each. 9.00
18 in. cut.....each. 9.50
Lead.—Sheet.....₱ lb 7½c
Pipe.....₱ lb 6½c
Locks.—Norwalk.....dis 15 %
Eagle Cabinet.....dis 25 %
Eagle Trunk.....dis 15 %
W. Wilcox & Co., Padlocks.....dis 30 %
Manure Forks.—W. C. & Co.....dis 60 %
Mattocks.—
K. P. & Co., Long Cutter, $16.00 ₱ doz.....dis 50 %
K. P. & Co., Short Cutter, $15.50 ₱ doz.....dis 50 %
K. P. & Co., Pick Cutter, $16.00 ₱ doz.....dis 50 %
Measuring Tapes.—Eddy's.....dis 20 %
Meat Cutters.—Miles' Challenge.....dis 30 %
Hale's, (new list).....dis 40 & 10 %
American.....dis 25 %
Money Drawers.—Tucker's Am.....₱ doz $32.50
Mouse Traps.—Delusion.....₱ doz 1.50
Novelty.....₱ doz
Nails......₱ keg 3.50
Oilers.—Zinc and Tin.....dis 60 %
Brass and Copper.....dis 50 %
Ox Bows.—Extra finished and varnished.....dis 10 %
1¼ in., ₱ doz. pair...$7.00 | 2 in., ₱ doz. pair, $10.00
1⅜ in., ₱ doz. pair... 9.00 | 2½ in., ₱ doz. pair, 12.00
Paper.—Tarred Sheathing.....₱ lb 2½c
Tarred Easie Brand.....₱ lb 2½c
Picks.—K. P. & Co., Adze Eye, 5 to 6 lb $12.00...dis 50 %
K. P. & Co., Adze Eye, 6 to 7 lb $13.00.....dis 50 %
Planes.—
Fancy Planes.....dis 15 %
Razee Planes.....dis 20 %
[illegible].....dis 20 %
English Iron.....dis 20 %
Bailey's.....dis 20&10 %
Plated Ware.—Rogers & Bro.....dis 40&5 %
Pliers.—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %
Plumb & Levels.—Stanley R. & L. Co ...dis 65&10 %
Pocket Knives.—American Shear Co.'s.....dis 40 %
Potato Diggers.—W. C. & Co., reduced list..dis 60 %
Pulleys.—Acme or Excelsior, 1¾ in.....₱ doz 23c
Acme or Excelsior, 2 in.....₱ doz 27c
Pulley Blocks......dis 35 %
Pumps.—Union Manufacturing Co.
Iron Cistern.....dis 40 %
Iron Pitcher Spout.....dis 65 %
Copper.....dis 30 %
Rivets.—Black (new list).....dis 40 %
Carriage in 10 lb papers (new list).....dis 40 %
Copper.....dis 33⅓ %
Razors.—Torrey's.....dis 20 %
Razor Straps.—Torrey's.....Full line
Rules.—Stanley, Boxwood.....dis 70 &10 %
Stanley, Ivory.....dis 55&10 %
Sad Irons.—Common.....₱ lb 3½c
Laundry.....₱ lb 6½c
Tailors' Geese.....₱ lb 6 c
Enterprise, "Potts".....dis 35 %
Sash Locks.—King & Hutchinson's, new list.dis 40 %
Sandpaper.—Bauder & Adamson.....dis 30 %
M. B. & D.....dis 15 %
Sash Weights.—Patent Eye.....₱ lb 1½c
Saws.—Hand Saws, Disston's.....dis 20 %
Wheeler & Clemson.....dis 20 %
Cross-Cut Saws.
W. M. & Co., Common Tooth, No 1.....₱ foot 35c
W. M. & Co., Champion Tooth.....₱ foot 35c
Disston's, Common Tooth.....₱ foot 60c dis 40 %
Disston's Great American Tooth...₱ foot 60c dis 40 %
Boynton's Lightning Tooth.....₱ foot 45c
M. B. & D., Hand Saws.....dis 33⅓ %
W. M. & Co.'s Circular Saws.....dis 35 %
Richardson Bros.....dis 25 %
Saw Blades.—Disston.....dis 20 %
W. M. & C.....dis 10 %
Welch & Griffith, Extra.....₱ doz $8.40
Welch & Griffith, No. 2.....₱ doz 7.00
Scales.—Fairbanks.....dis 20 %
Screws.—Aiken's Flat-Head Iron new list, dis 50 & 10 %
American Flat-Head Iron.....new list, dis 50 & 10 %
American Flat-Head Brass.....new list, dis 50 & 10 %
American Round-Head Brass...new list, dis 40 & 10 %
American Round-Head Iron...new list, dis 45 & 10 %
Grilley Round Head Nickel-Plated Common..dis 40 %
Scythes.—Clippers, in boxes.....₱ doz $6.75
Shaves.—Kimball's.....₱ inch 75c
Watrous.....dis 15 %
Shears.—American Shear Co., new list.....dis 70 %
Shot.—Tatham's.....₱ lb 7c
Shovels.—O. Ames, new list.....dis 15 %
O. Ames, other brands, new list.....dis 15 %
M. B. & D.....dis 15 %
Sinks.—Magee Patent.....dis 30 %
Snow Shovels......$4.00
Skates.—Union.....dis 25 %
Acme.....dis 25 %
Imperial Club list No. 5, $5.75 ₱ pair; list No. 7, $8.00 ₱ pair.....dis 25%
Stocks and Dies.—King's.....dis 10&5 %
Tacks.
Swedes Tinned.....dis 30&10 %
Swedes Iron.....dis 30 & 10 %
Gimp and Lace.....dis 20 & 10 %
Copper Tacks.....dis 30 & 10 %
All balances on list.....dis 20&10 %
Traps.—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 50 %
Blake's.....dis 40&10 %
Vises.—Simpson's Adjustable.....dis 25&5 %
Howard Vise Co.....dis 25 %
Prentiss'.....dis 20 %
Weather Strips.—Packer's.....₱ doz $4.00
Browne's Flexible Rubber.....dis 30 %
In 25 feet boxes: No. 1, ⅜ in. wide, ₱ yard, 10c.; No. 2, ⅝ in., 15c.; No. 3, ¾ in., 20c.; No. 4, 1 in.....25c
Black Walnut Spring Weather Strips.....₱ doz $3.50
Window Springs......d'n 33⅓ %
Babcock's No. 3.....₱ gross $6.25
Babcock's No. 4.....₱ gross 4.15
Wire Cloth.—"Clinton".....₱ ft.
Wire Fence.—Scutt's Patent, Painted.....₱ lb 7½c
Scutt's Patent, Galvanized.....₱ lb 6½c
Wire Goods.—Gate Hooks and Eyes, &c., dis 55&10 %
Wrenches.—A. G. Coe's.....dis 50 %
Girard Mfg. Co.....dis 50 & 10 %
Girard Agt.....dis 60 & 10 %
Wringers.—
Novelty No 2 for Common Tubs.....₱ doz 42.00
Novelty " 3 " " " .....₱ doz 48.00
Excelsior E " " Stationary Tubs.....₱ doz 51.00
Excelsior F " " " .....₱ doz 57.00
Excelsior A with Folding Bench.....₱ doz 69.00
Excelsior B " " " .....₱ doz 63.00
$3.00 per doz dis if ordered in not less than 1 doz lots, and $2 per doz dis if ordered in not less than 4 doz lots.
Novelty Set Tub, E.....₱ doz 40.00
Keystone, Wood Frame No 1½.....₱ doz 39.00
Keystone, Iron Frame No 2½.....₱ doz 37.00
Zinc.....₱ lb 6½c

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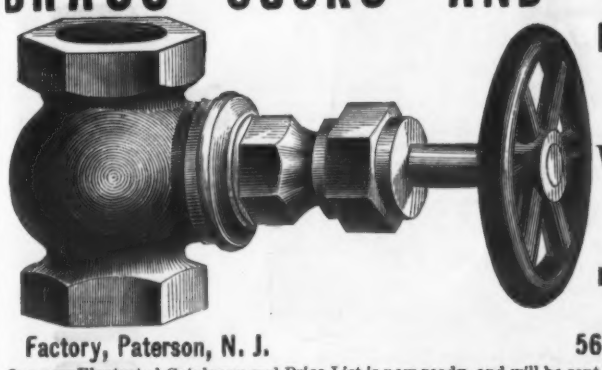

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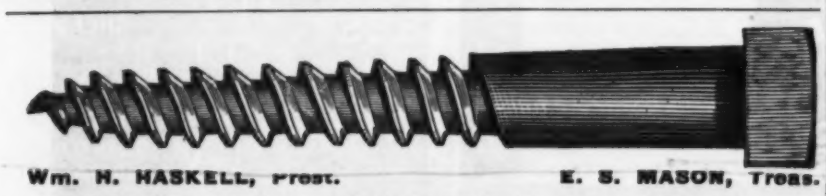

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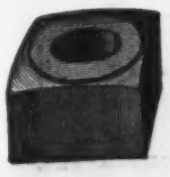

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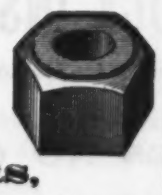

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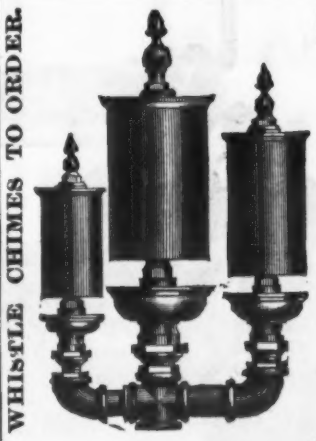

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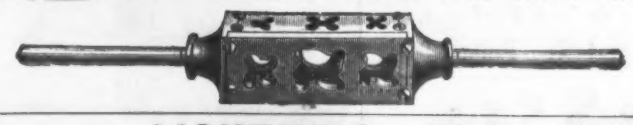

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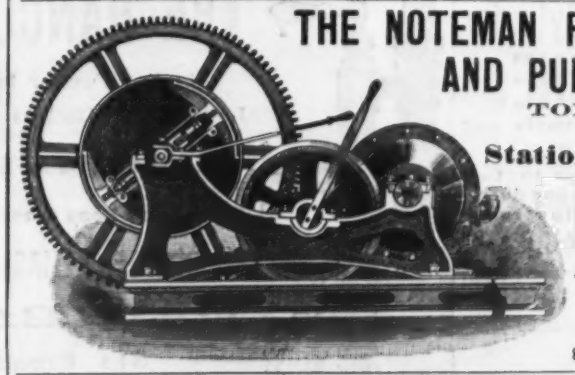

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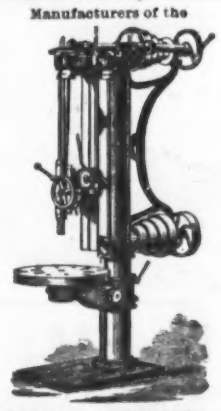

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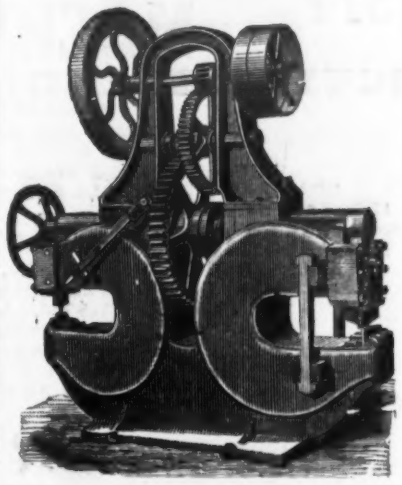

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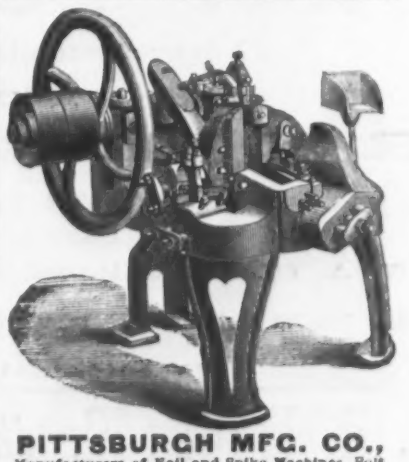

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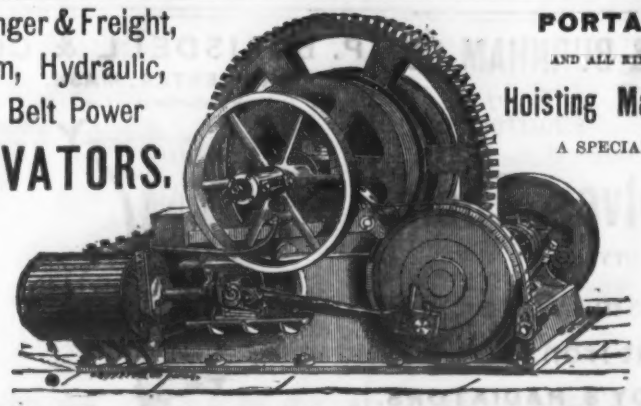

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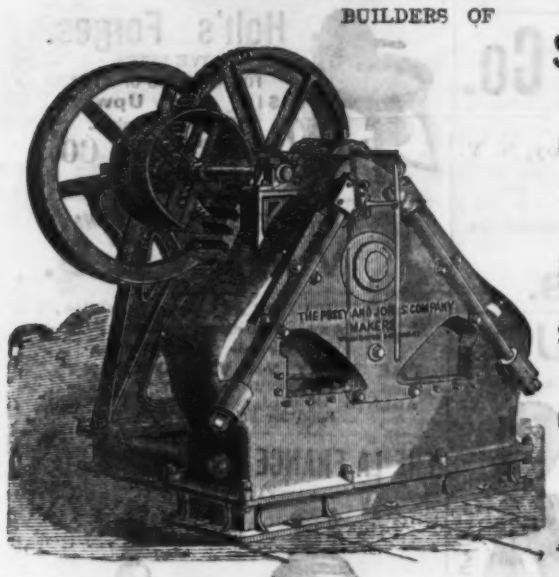

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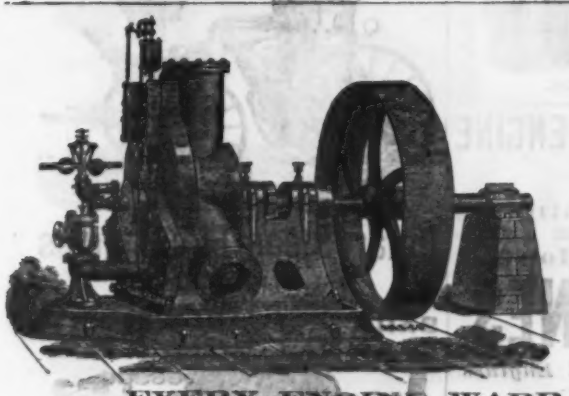

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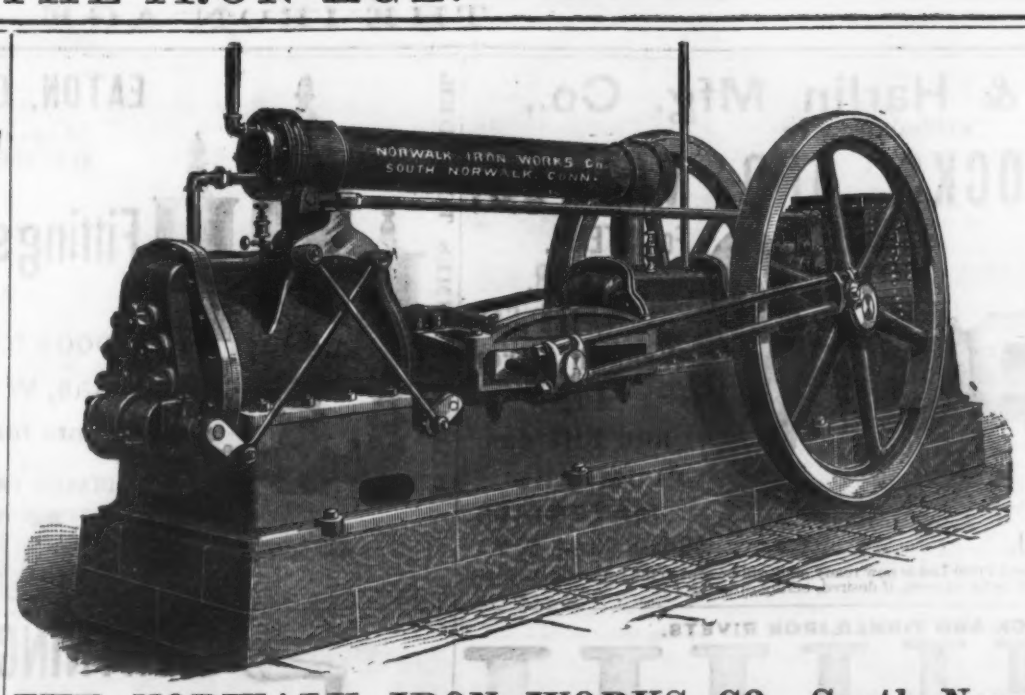

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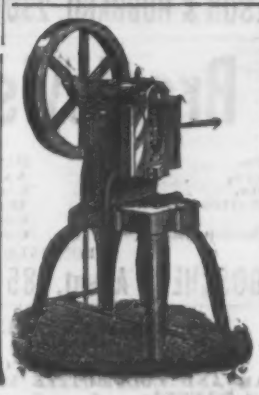

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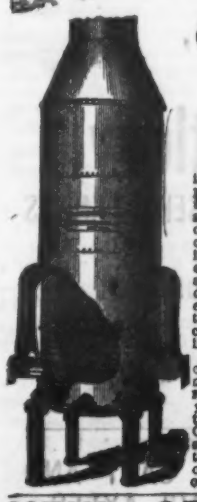

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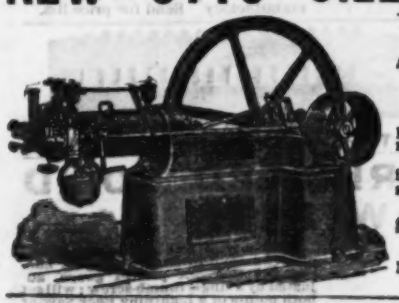

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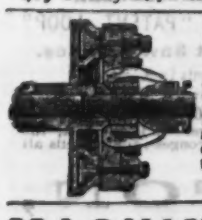

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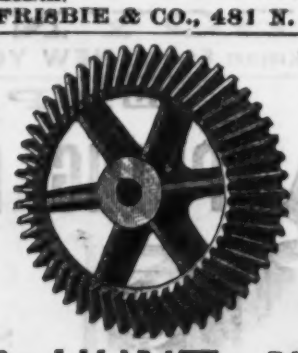

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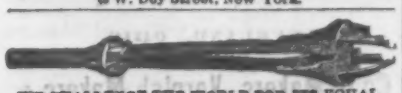

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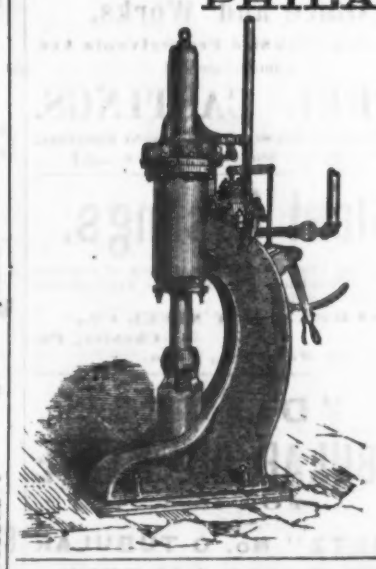

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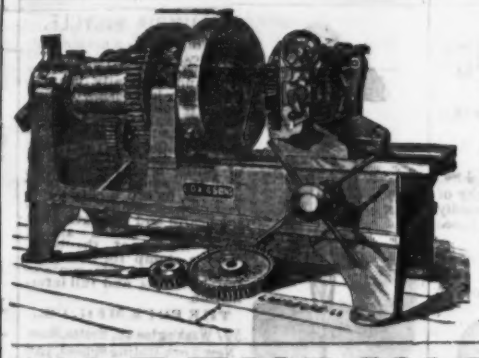

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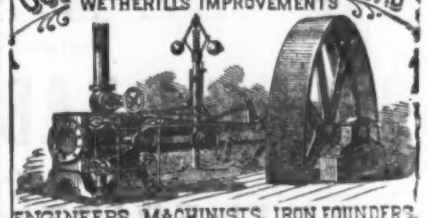

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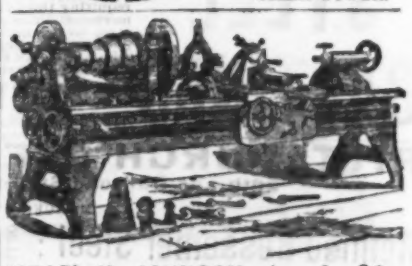

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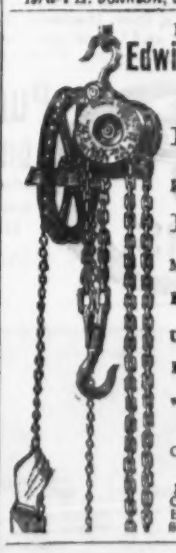

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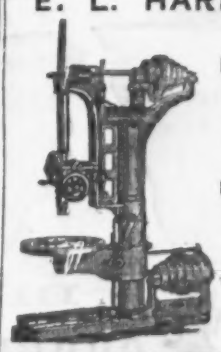

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